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REVIEW SUMMARY

After reviewing information and analytical data regarding the composition of BASF anticorrosion wax coating S51Z001, it is my opinion the ingredients or ingredient equivalents which are specified in claims 1 of U.S. Patent 3,959,450 and of U.S. Patent 4,356,036 are present in BASF anticorrosion wax coating S51Z001. The following is a tabular summary of the ingredients, or ingredient equivalents, which are specified in claims 1 of U.S. Patent 3,959,450 and of U.S. Patent 4,356,036 and are present in BASF anticorrosion wax coating S51Z001.

U.S. PATENT NO. 3,959,530

INGREDIENT	BASIS FOR OPINION
Paraffin	1. Absolute Analytical Laboratory (AAL) analyses of BASF liquid sample S51Z001 2. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 3. BASF laboratory analysis of BASF S51Z001
Microcrystalline Wax	1. Absolute Analytical Laboratory (AAL) analyses of BASF liquid sample S51Z001 2. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 3. BASF laboratory analysis of BASF S51Z001
Perchloroethylene	1. Absolute Analytical Laboratory (AAL) analyses of BASF liquid sample S51Z001 2. AAL analyses of anticorrosion wax coatings obtained from 1984 Olds Cierra 3. BASF laboratory analysis of BASF S51Z001
Petroleum Distillate	1. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 2. American Society for Testing and Materials (ASTM) "Manual on Hydrocarbon Analysis" Table I
Surfactant	1. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 2. Chemical Abstracts Service (CAS) reference search Stearic Acid/surfactant

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U.S. PATENT NO. 3,959,530

INGREDIENT	BASIS FOR OPINION
Surfactant (cont.)	3. Absolute Analytical Laboratory (AAL) report on GM MSDS of 998-1128. 4. Literature review of commercial surfactants. 5. AAL analyses of anticorrosion wax coatings obtained from auto scrapings
elating Agent	1. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 2. Chemical Abstracts Service (CAS) reference search Stearic Acid/ligand and P.P. Methy Diamine/ligand 3. Absolute Analytical Laboratory (AAL) report on BASF liquid sample S51Z001 4. Literature review of ligands/chelating agents.

U.S. PATENT NO. 4,356,036

INGREDIENT	BASIS FOR OPINION
Aluminium or Zinc Paste	1. Absolute Analytical Laboratory (AAL) analyses of BASF liquid sample S51Z001 2. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 3. AAL analyses of anticorrosion wax coatings obtained from 1984 Olds Cierra
Microcrystalline Wax	1. Absolute Analytical Laboratory (AAL) analyses of BASF liquid sample S51Z001 2. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 3. BASF laboratory analysis of BASF S51Z001

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INGREDIENT	BASIS FOR OPINION
Aromatic Hydrocarbon Resin; R&B 70-140C	1. BASF supplier (Neville Co.) MSDSs and product literature. 2. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 3. BASF laboratory analysis of BASF S51Z001 4. BASF formula cards and batch information 5. Absolute Analytical Laboratory (AAL) analyses of BASF liquid sample S51Z001
Chlorinated Rubber having a combined chlorine content of at least 66%	1. AAL analyses of BASF liquid sample S51Z001 2. AAL analyses of anticorrosion wax coatings obtained from 1984 Olds Cierra
Barium Sulfonate	1. AAL analyses of BASF liquid sample S51Z001 2. AAL analyses of anticorrosion wax coatings obtained from 1984 Olds Cierra 3. AAL analyses of BASF liquid sample S51Z001
Chlorinated Solvent	1. AAL analyses of BASF liquid sample S51Z001 2. AAL analyses of anticorrosion wax coatings obtained from 1984 Olds Cierra 3. BASF laboratory analysis of BASF S51Z001
Aromatic Hydrocarbon Solvent	1. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 2. American Society for Testing and Materials (ASTM) "Manual on Hydrocarbon Analysis" Table I
Mineral Spirits Solvent	1. General Motors,BASF, and BASF supplier Material Safety Data Sheets (MSDS) 2. American Society for Testing and Materials (ASTM) "Manual on Hydrocarbon Analysis" Table I 3. BASF formula cards and batch information

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ALEX RHODES,P.C.
LAB I.D.# 90/01023/105

SUMMARY REPORT OF BASF ANTI-CORROSION WAX COATING S51Z001

1.0 PERCHLOROETHYLENE

1.1 Two types of wax based antirust samples were analysed by our laboratory. One type consisted of scrapings of various wax based antirust samples obtained from the interior surfaces of car doors. The second type consisted of a production line sample of S51Z001 (Inmont 998-1128). Perchloroethylene was detected in anticorrosion waxes in ur laboratory using a technique known as dual column gas chromatography with the electron capture detector (see Byrd deposition exhibit 19,81.110). The sensitivity of this technique is particularly important for these types of samples when one considers sensitivity and selectivity. The sensitivity and the selectivity of the electron capture detector allows for detection limits three-five orders of magnitude greater than that obtainable by the mass spectrometer detector (see enclosure #1).

1.1.1 Based upon BASF Laboratory tests (see Ramesh deposition) the sample of aluminized anticorrosion wax tested at the BASF laboratory was diluted 1:10 in hexane. Approximately two (2 ul) microliters of the mixture was injected into the gas chromatograph/mass spectrometer.

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Because the density of hexane is 0.6603 (see enclosure #2) two microliters of the solvent would have a mass of approximatley 1.32 milligrams (2 ul x 0.6603 mg/ul=1.32 mg) of which ten percent is the sample is the sample. This amounts to 132 micrograms (1.32 mg x .1= 0.132 mg or 132 micrograms) of sample injected. Once injected the sample would be further split (typically 1:50-100) reducing the effect amount going to the mass spectrometer to 1.32- 2.64 micrograms (130 micrograms / 50-100 = 1.32-2.64 micrograms). Using a routine detection limit of 10 nanograms for the mass spectrometer, the method used by BASF could only detect concentrations of perchloroethylene which were greater than 7,600 parts per million (ppm) or 0.76 % perchloroethylene in the sample. This is an optimum estimate based upon 100 percent dissolution of the sample which was not reported (Ramesh deposition).

1.1.2 By contrast the method used in our laboratory utilized samples having a mass in the range of 0.1-0.5 grams which were sealed in a vial with a volume of approximately 1.5 ml. The sealed vial was heated to liberate vapors of perchloroethylene present afterwhich a

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sample ~0.5-1 ml taken for analysis. A conservative estimate of effective sample mass injected would be 33 mg (0.5ml/1.5ml x 100mg=33 mg). Since picogram detection limits are routine with the electron capture detector (see enclosure #1&3) then one could conservatively expect to be able to detect 30.3 parts per trillion (ppt) perchloroethylene (10^{-12} grams of perchloroethylene-detection limit/$3.3x10^{-2}$ grams of sample= 0.000000000030 or 30ppt). This represents over one hundred million times greater sensitivity than could be achieved using the BASF method. Our detections limit along with dual column confirmation by gas chromatography is an appropriate method of analysis and identification when the analyte is below the detection limit of the mass spectrometer.

1.1.3 We note that the ECD method was not previously used until the need arose to analyse low levels of perchloroethylene in the scraping samples taken from the G.M. doors. Our prior reports (see Byrd deposition exhibit #6) did not use the ECD technique because electron capture detector was not available and installed in our gas chromatograph until after these reports were issued, therefore we were not able to carry out this kind analysis.

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1.1.4 The analysis performed by the BASF laboratory with the gas chromatograph electron capture detector does not provide evidence that perchlcroethylene and toluene coelute.

Tests in our laboratory with toluene and perchloroethylene performed on a DB-624 column indicate that toluene and perchloroethylene do not coelute and are well resolved (see enclosure #4). Our results were further substantiated by a telephone conference with the column manufacturer (J & W Scientific;Redondo,California). The manufacturer stated that toluene and perchloroethyene do not coelute under the analytical conditions used. The column manufacturer further stated that toluene would not interfer due to its low relative responce to the electron capture detector. Additional information obtained from our tests indicate that toluene at very high concentrations (ca. 1-2 % toluene) result in extremely small signals from the electron capture detector corresponding to less than 20 microvolts (see enclosure #4). Small responses of the electron capture detector to high concentrations of toluene should be borne in mind when examining the BASF laboratory results with the electron capture detector.

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Our laboratory results show that it is not possible for toluene to produce the signal reported by BASF to the toluene standard (exhibit #5) which depicts signals of ~750 millivolts to corresponding to "0" amount of standard of toluene. Rather the BASF results indicate contamination of the BASF standard with perchloroethylene. Another implication of this is that the BASF laboratory was detecting perchloroethylene in the anticorrosion sample (see enclosure #6) as evidenced by the peak at 3.497 minutes. Lack of rigorous methodology led to the improper conclusion that toluene and perchloroethylene coelute (see Ramesh deposition exhibit #1).

1.1.5 The report issused by Chemical Industrial Services, Inc. on March 24, 1982, it is not inconsistent our test results with respect to perchloroethylene or the analytical capabilities of an industrial testing lab such as Chemical Industrial Services, Inc. It is only in recent years that analytical techniques and information were available regarding trace and ultratrace determinations. This type of analysis is a highly specialized area and not the province of industrial

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laboratories, such as Chemical Industrial Services, Inc. We further note that the type of instrumentation required to do this analysis was not present at my visit to Chemical Industrial Services, Inc. Lastly, upon explaining the technique to Mr. Ray of Chemical Industrial Services, Inc., he concurred with the findings of our laboratory.

2.0 PETROLEUM DISTILLATES AND AROMATIC SOLVENTS

2.1 The presence of petroleum distillates and aromatic solvents in the BASF coating is disclosed by the MSDS's of BASF suppliers. The patent 3,959,450 specifies that a petroleum distillate having a boiling point range between 350-380 F. Patent # 4,356,036 specifies an aromatic hydrocarbon solvent. The Material Safety Data Sheets (MSDS) supplied by BASF specify solvents having aromatic constituents as major constituents. The Material Safety Data Sheets (MSDS) supplied by BASF specify solvents having major constituents that are petroleum derived distillates having a boiling point range between 350-380 F.

2.1.1 The boiling points of various solvents used by BASF in the formulation of the S512001 ANTI-RUST (see enclosure #7) as called out

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in the formulary cards were compared to the corresponding BASF MSDS's (see enclosure #9) reported boiling point data. The solvents, when generic solvent descriptions were used, were also compared to an American Society of Testing and Materials (ASTM) "Manual of Hydrocarbon Analysis" hydrocarbon characteristic table (see enclosure #8). Our results our tabulated below:

BASF CODE #	MSDS BP (F)	MANUAL BP RANGE (F)	COMMENT
SP0624	313-355	258-384	UNION CHEMICAL
SP0603	310-360	-	ASHLAND CHEMICAL CAS:8052-41-3
SP0604	310-360	258-384	ASHLAND CHEMICAL
PZ0165	313-388	303-384	UNITED STATE BRONZE POWDERS
SP0604	325-384	303-384	SHELL

2.1.2 We note that the "Manual of Hydrocarbon Analysis" indicates that the boiling point of a C11 hydrocarbons, such as used in Union Chemicals Super High Flash Naptha (BASF additive code SP0624), has a listed boiling point of 384 F. This is not reflected in the MSDS corresponding to SP0624, however, this component would have such a boiling point. The manual likewise indicates that the boiling point of a C10 hydrocarbons, such as used in Union Chemicals Super High

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Flash Naptha (BASF additive code SP0624), has a listed boiling point of 353 F. Similar examples can be found in the other listed BASF MSDSs.

2.1.3 The aromatic hydrocarbons content of solvents used by BASF in the formulation of the S512001 ANTI-RUST (see enclosure #9) as called out in the formulary card were compared to the corresponding MSDS's aromatic hydrocarbons data. The solvents, when generic solvent descriptions were supplied, were also compared to an ASTM hydrocarbon characteristic table (see enclosure #8). Our results our tabulated below:

BASF CODE #	ASTM MANUAL	MSDS DATA %	AROMATIC TYPE
SP0624	PRESENT	0-10	XYLENES
UNION CHEM.	PRESENT	20-45	TRIMETHYLBENZENE
AMSCO SOLV	PRESENT	NA	CUMENE
1435	PRESENT	95	TOTAL AROMATICS
	PRESENT	NA	MONOBENZENES
	PRESENT	NA	AROMATIC NAPHTHENES

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BASF CODE #	ASTM MANUAL	MSDS DATA %	AROMATIC TYPE
SPO604	PRESENT	~ 4	TRIMETHYLBENZENES
ASHLAND	PRESENT	NA	MONOBENZENES
MINERAL SPTS.	PRESENT	NA	AROMATIC NAPHTHENES
SPO604	PRESENT	10-11	AROMATICS
SHELL	PRESENT	NA	MONOBENZENES
MINERAL SPTS.	PRESENT	NA	AROMATIC NAPHTHENES

2.1.4 In summary the tables indicate that solvents used by BASF in the formulation of the S51Z001 ANTI-RUST (see enclosure #7) as called out in the formulary cards contain mineral spirits, aromatic hydrocarbons, and petroleum derived distillates with constituents with boiling points between 350-380 F. We note that the aromatic components are not present in "trace" quantities, rather the constituents represent major components. Another important consideration is the use of solvent compatable with the Ross Wax 160 (see enclosure #10) which the manufacturer identified as hot naphtha, xylene, toluene, carbitol, isopropanol or trichloroethylene. The first three of the listed solvents are aromatic hydrocarbons or contain aromatic hydrocarbons (eg.naphtha) and appear on the forementioned tables.

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3.0 SURFACTANT

3.1 The evidence presented in numerous BASF MSDSs, laboratory results and in the scientific and industrial literature indicate that a surfactant or surfactants are present in the BASF formulation S512001 ANTI-RUST.

3.1.1 The MSDS forms of GM and BASF suppliers (see enclosure #11) list stearic acid as one of the ingredients. Examples of stearic acids use are indicated by the listing of stearic acid by a chemical standards supplier (see enclosure #12). A search of chemical abstracts (see enclosure #13) identified several references with respect to stearic acids use as a surfactant.

3.1.2 Although stearic acid is classified as a anionic surfactant, never the less it is a surfactant and produces the desired surface energy changes with respect to manner of use and efficacy when compared to nonionic surfactants.

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4.0 CHELATING AGENTS

4.1 Examination of the ingredients listed on the submitted MSDS forms used by GM and BASF suppliers (see enclosure #11,14) list stearic acid (C.A.S. # 57-11-4) and P.P. Methyl Diamine (C.A.S. # 101-77-9) as ingredients. Both chemicals possess ligands (see enclosure #15,see Byrd deposition exhibit #106) which are capable of binding to metals.

4.1.1 Stearic acid is shown to be chelating agent in references through chemical abstracts searches (see enclosure #15). The carboxyl group on the stearic acid is the ligand which binds to the metal (see Byrds deposition 106a). The alkyl portion of the stearic acid would embed in the wax matrix and the ligand portion would locate on the external surface of the wax where the ligand could bind to metal.

4.1.2 P.P. Methyl Diamine has been shown to be a chelating agent in references through chemical abstracts and literature searches (see enclosure #15,see Byrd deposition exhibit #106). The amine groups of P.P. Methyl Diamine are the ligands which bind to metal (see Byrds deposition 106).

4.1.3 Based upon the literature sited the there is ample evidence that indicate stearic acid (C.A.S. # 57-11-4) and P.P. Methyl Diamine

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(C.A.S. # 101-77-9) can bind metals. In this way they are used and function in a similar fashion to N,N,N´,N´-tetrakis (2-hydroxypropyl) ethylenediamine.

5.0 AROMATIC HYDROCARBON RESINS

5.1 The coating of Patent # 4,356,036 includes an aromatic hydrocarbon resin. Our review of the Material Safety Data Sheets (MSDS) supplied by BASF lists several products having hydrocarbon resins as the primary constituent. BASF used an assortment of the hydrocarbon resins which had softening points between 70-140 C.

5.1.1 We note that all the BASF MSDS´s which have been supplied, indicate that BASF used hydrocarbon resins with a R&B softening point between 70-140C. A tabulation of hydrocarbon resin and their respective ring and ball softening temperatures are given below:

BASF CODE #	RING & BALL (C)	SUPPLIER/TYPR
RR0109	103	NEVILLE CHEMICAL NEVCHEM 100 RESIN
RR0152	105	NEVILLE CHEMICAL LX-685 125 RESIN
G-112	90-102	HERCULES

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.1.2 An infrared spectra obtained by BASF chemist Hiro Fujimoto of ASF a 1987 batch sample of S51Z001 ANTI-RUST indicates the presence f an aromatic hydrocarbon resin. This was also the tesitmony of BASF hemist Hiro Fujimoto with respect to the presence of an aromatic ydrocarbon resin in the BASF a 1987 batch sample of S51Z001 ANTI-UST.

.1.3 The analysis of BASF a 1987 batch sample of S51Z001 ANTI-RUST onducted under BASF chemist Ramesh (see Ramesh deposition exhibit) determine the presence of chlorinated rubber using pyrolysis/gas romatography/mass spectrometry (py/gc/ms) indicates the presence of veral aromatic hydrocarbon pyrolytic products which further dicates the presence of an aromatic hydrocarbon resin.

1.4 The BASF formula cards indicate that the BASF code 0152 hydrocarbon resin (Neville LX-685, 125) was used from 1979 til the line was abandoned S51Z001 ANTI-RUST. This further indicates t an aromatic hydrocarbon resin was used with a R&B between 70-140 rom 1979 -1987.

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6.0 BARIUM SULFONATE

6.1 Our laboratory testing indicate that barium was found in an Inmont formulation and in some wax scapings found in the field.

6.1.1 Barium sulfonate is composed of barium and sulfonate salts. For barium sulfonate to be present both barium and sulfur elements must be detected. Our previous tests indicate the presence of barium, a more recent test indicates that sulfur is present in the Inmont sample 998-1128.

6.1.2 Barium sulfonate is commonly regarded as a surfactant (enclosure #16). Sulfonates listed on MSDSs for GM formulation 998-1128 ANTI-RUST calcium sulfonate, lead sulfonate and calcium lignosulfonate.

7.0 CHLORINATED RUBBER

7.1 Our laboratory testing indicates that chlorinated rubber with a combined chlorine content of at least 66 % was present in the BASF S512001 formulation and in wax scapings from GM automobiles taken in the field. This is based upon analysis (Byrd deposition exhibit #19) performed with in our laboratory with a chlorinated rubber with a combined chlorine content of at least 66 % commercially available as Parlon (S10) manufactured by Hercules Inc..

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OCTOBER 25,1991

ALEX RHODES,P.C.
30100 TELEGRAPH RD.,STE. 460
BINGHAM FARMS,MI 48025
ATTN:ALEX RHODES

RE: SUMMARY OF RECENT LABORATORY RESULTS WITH RESPECT TO PATENTS #3,959,530 & 4,356,036.

A summary of our test results on coating materials obtained from inner surfaces of doors of recent model cars are tabulated on the attached sheet. This report is an interim report on this subject.

We note that further tests are in progress on coatings from other doors obtained in the field.

Absolute Analytical Laboratory,

David Byrd RS

David W. Byrd
Laboratory Director

aka
enclosures

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ALEX RHODES,P.C.
LAB I.D.# 91/01023/221

1.0 A N A L Y T I C A L S U M M A R Y *

1.1

PARAMETER	1989 ELDORADO FRONT RIGHT	METHOD
ZINC	:PRESENT	ATOMIC ABSORBTION SPECTROPHOTOMETRY
CHLORINATED SOLVENT	:PRESENT	SH/GAS CHROMOTOGRAPHY/HECD&PID

SH=STATIC HEADSPACE
HECD&PID ARE DETECTOR TYPES

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

v.

Civil Action
No. 88-CV-73729-DT

Hon. Paul V. Gadola

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC.,

Defendants.

AFFIDAVIT OF PATRICIA MAREK

PATRICIA MAREK, being duly sworn, deposes and says:

1. I am a Vice President of Daubert one of the defendants in Civil Action 88 CV 73729 DT.

2. I have a B.S. in Chemistry, a B.S. in Chemical Engineering, and a M.S. in Analytical Chemistry.

3. I have been employed at Daubert since 1969, and have held various positions in analytical chemistry, quality control and research and development. During that time I have become fully familiar with all of Daubert's controls and procedures for formulating and mixing its products, testing the raw materials, and controlling the composition and quality of the products. I am the person most familiar with Daubert's records and procedures by which it keeps data and information relative to its formulations and products.

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EXHIBIT F

4. I am personally aware of all products which have been sold to General Motors.

5. Daubert has only sold three wax-type rust-control products to General Motors. They are identified as Nox-Rust X-151, Nox-Rust X-170 and Nox-Rust X-175.

6. Attachment 1 lists the ingredients of the Nox-Rust X-151 product. This product is a wax-type product that contains a small amount of an aluminum paste. Due to the addition of the aluminum paste, the product has a silver color.

7. Attachment 2 lists the ingredients of Nox-Rust X-170. This product is a clear wax-type product.

8. Attachment 3 lists the ingredients of Nox-Rust X-175. This product is a clear brush-on composition and sold as a service item. The ingredients of the X-175 product are essentially the same as the X-170 product, except that clay was added to make the product thicker for brush-on application.

9. X-151 was sold to General Motors during the period 1979 to 1986. It no longer is being made or sold. X-170 was sold to General Motors from June, 1984 to the present, although the sales have declined drastically and are now very small. X-175 was supplied to General Motors for only a short period of time and in small quantities.

10. The three Nox-Rust products X-151, X-170 and X-175 were developed totally independently by Daubert. We did not receive any formulas or samples from General Motors or any other supplier which related to or assisted us in the development of these products. Daubert started its business in 1935 making anti-

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corrosion coatings, has developed extensive expertise in its fifty-plus years as a chemical company, and did not need any assistance in developing products to meet the specifications and needs of General Motors.

11. X-151 was prepared by Daubert over the period from 1975-78 to meet General Motors Specification 998-1128. Nox-Rust X-151 was approved by General Motors in 1978 and first sold to them in February 1979. The formula of X-151 remained basically the same from 1979 to 1986. This is substantiated by the batch sheets which show the ingredients of each and every batch of Nox-Rust X-151 which was made and sold by Daubert to GM. Copies of these records have been supplied in their entirety to Kaliardos' attorneys.

12. Nox-Rust X-170 was prepared by Daubert pursuant to General Motors Specification 998-2150. It was first sold to General Motors in 1984 and has remained basically the same ever since. This is substantiated by the batch sheets which show the ingredients of each and every batch of Nox-Rust X-170 which was made and sold by Daubert to GM. Copies of these records have been supplied in their entirety to Kaliardos' attorneys.

13. As to Nox-Rust X-175, only two small quantities were prepared in the lab and no large quantities or "batches" were ever made. Thus there are no batch sheets available for this product. The ingredients used to make the X-175 products are included in Attachment 3. These documents have also been provided to Kaliardos' attorneys.

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14. Under my supervision, various quality contr procedures were followed which assured that each batch of X-15 X-170 and X-175 contained the specific components of the requisi formula and in the appropriate amounts. The batch operato specifically followed the formulations and mixing instructions indicated on the batch sheets. Quality control procedures we utilized during the preparation of each of the batches to ensu that the final products met the requisite standards and specific tions. The batch sheets recorded and depicted all of the ingred ents, mixing steps, quality control testing and other procedu utilized for each batch.

15. Other than X-151 which contains aluminum paste, other wax-type composition containing aluminum or zinc paste been sold to General Motors. X-170 is the only current wax-t coating being sold to General Motors by Daubert.

16. None of the three Nox-Rust products sold to Gene Motors, namely X-151, X-170 and X-175, contain the follo materials specified in the claims of U.S. Patent No. 3,959,5

a) perchlorethylene; or

b) petroleum distillate having a boiling p ranging between 350° and 380° F;

c) nonionic surfactant;

d) nonylphenoxypoly (ethyleneoxy) ethanol;

e) N, N, N', N' - tetrakis (2-hydroxypropyl) ethylenediamine.

17. Also, none of these three Nox-Rust products sol General Motors contain the following materials specified in

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claims of U.S. Patent No. 4,356,036:

a) chlorinated rubber;

b) chlorinated rubber having a combined chlorine content of at least 66%;

c) chlorinated solvent;

d) aromatic hydrocarbon solvent; and

e) mineral spirits

In addition, the X-170 and X-175 products do not contain an aluminum or zinc paste, and the X-151 product does not contain "neutral barium sulfonate" which are specified in the claims of the 4,356,036 patent.

18. Based on my experience and knowledge, Daubert has never manufactured at any time or sold to any customer any wax-type rust-control coating compositions containing any of the items specified in Paragraphs 16 and 17 above.

19. The X-151, X-170 and X-175 records which are identified above in Paragraphs 11-13 and which were provided to Kaliardos' counsel prove that none of the items specified in Paragraphs 16 and 17 were ever added to or included in the Daubert Nox-Rust products. These records and batch sheets detail every quantity and batch of Nox-Rust X-151, X-170 and X-175 products which were ever made or sold by Daubert to GM.

20. I supplied quantities of the Nox-Rust X-151 and X-170 products to our attorneys who in turn supplied them to Shrader Laboratories in Detroit, Michigan for analytical testings. It is my understanding that such analytical testing proved that neithe

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product contained any evidence of perchlorethylene or chlorinated rubber.

21. I have reviewed the October, 1989 report by Absolute Analytical Laboratories which contained the results of alleged analytical testing on a 1984 Buick Skyhawk door (Attachment 4). The coating product apparently found and tested on that door could not have been a product supplied by Daubert. Not only does that analysis show the presence of perchlorethylene and chlorinated rubber which were not present in any of Daubert's coatings, but it also indicates that no trace of aluminum was found. I understand that GM has identified that 1984 Skyhawk door as one being made at its assembly plant in Leeds, Missouri. I personally examined the records of Daubert and found that the only product supplied by Daubert to that Leeds plant through 1984 was the Nox-Rust X-151 product which contains aluminum and has a silver color.

Dated: November __, 1991

Patricia Marek
Patricia Marek

STATE OF ILLINOIS)
) SS.
COUNTY OF DuPage)

Subscribed and sworn to before me this 27 day of November, 1991.

" OFFICIAL SEAL "
GERALDINE M. SERAPONAS
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 11/7/94

Geraldine M. Seraponas
Notary Public
DuPage County, Illinois
My Commission Expires: 11/7/94

BK
LAW OFFICES
BROOKS & KUSHMAN
1000 TOWN CENTER
TWENTY-SECOND FLOOR
SOUTHFIELD, MI 48075
(313) 358-4400

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC., jointly and severally,

Defendants.

Civil Action
Case No. 88-CV-73729-DT

HON. Paul V. Gadola

/

AFFIDAVIT OF NICOLAS KALIARDOS

STATE OF MICHIGAN)
) SS
COUNTY OF OAKLAND)

I was born in Detroit Michigan on December 26, 1926. In 1934, when I was eight years old, my mother took me and my brother to live in Greece because she was unable to adjust to life in America. My father remained in America and sent money to Greece to support my mother, my brother and I. I remained in Greece until 1945. When I was 15 years old, I joined a group of Greek partisans and fought with them in the mountains of northern Greece.

After the war, I returned to the United States, served in the U.S. Army, got married, bought a cleaning business, raised a family and invented the coatings which are described in the two patents of this lawsuit.

I have never attended college. My knowledge of chemistry was acquired in Greek schools, from reading books, from product literature, from chemical company employees and from experience. My familiarity with the Greek language helped me because many chemical words are derived from Greek words.

My interest in coatings began when I purchased a 1968 Pontiac from Causley Pontiac, Detroit, Michigan. I noticed that the car had a white substance on the black vinyl top. After several unsuccessful attempts of the car dealer to remove the white substance, I began to experiment with chemicals that I had at my cleaning business for removing stains and waterproofing garments. I purchased other chemicals and obtained free samples from chemical companies.

After many experiments, I invented a product which removed the white stain and improved the finish of the vinyl top. I was very pleased that I was able to do something which a General Motors dealer could not do. I thought that General Motors would be interested in my product. Through a mutual friend, I was introduced to a DuPont sales representative, Mr. Charles King. General Motors was one of Mr. King's accounts for paints and coatings.

I named my product Sinowax 6 in 1. Mr. King took samples of Sinowax 6 in 1 to the Fisher Body Division of General Motors in 1971. Mr. King told me that Fisher Body would buy Sinowax 6 in 1 if it would protect bare steel against corrosion. Fisher Body supplied Mr. King with bare steel test

panels which I coated and Fisher Body tested for corrosion.

In the beginning Fisher Body wanted a coating which would withstand 24 hours of salt spray. Later they wanted more resistance to salt spray and added other requirements. Fisher Body needed a coating which would protect the bottom of vehicle doors against corrosion. From 1971 through 1981 I continued to experiment and to supply different formulations to Fisher Body. I worked 7 days a week and long hours each day on the Fisher Body anti-corrosion requirements. This work involved thousands of hours of my time. During my experiments, I changed the ingredients in the formulas and the amounts of the ingredients. I constructed a salt spray fixture and ran corrosion tests.

From about 1972 to 1981 I continuously brought samples to the Fisher Body Corrosion Laboratory. I was never compensated for the samples nor were any unused samples returned to me. During some months I delivered several samples to the Fisher Body Lab. I also visited the Lab frequently and discussed the results of the tests with the Corrosion Lab engineers. The engineers always commented favorably on the test results but refused to allow me to see or have copies of the reports. Tests of my coating at outside laboratories also proved that the coating met the General Motors' corrosion requirements.

On May 25, 1976 I was granted U.S. Patent No. 3,959,530 ('530 Patent). The patent covers an anti-corrosion coating

containing wax, a chlorinated solvent, mineral spirits, a surfactant and a chelating agent.

Wax is used because it is waterproof and remains pliable in cold and hot weather. I first used wax because it was available at my cleaning plant for waterproofing garments. I noticed that when I waterproofed garments, the wax coated the metal buttons of the garments and improved their appearance.

The chlorinated solvent prevents the coating from separating and sagging. I discovered this when I was experimenting with the bare metal test panels which General Motors gave me to coat. I noticed that the panels were covered with a thin film of oil. I discovered that when I added perchloroethylene to my test samples, the perchlorethylene helped the wax to adhere to the surface. I also discovered that the perchlorethylene evaporated very quickly. This prevented the coating from sagging. I found out that perchloroethylene was a very important ingredient for meeting the General Motors corrosion requirements.

The corrosion of General Motors' doors during the 1970's was a unique corrosion problem. The doors were constructed of an outer steel panel joined to a steel inner panel. The General Motors engineers called the joint which extended around a door a hem flange. The hem flange consisted of a turned up flange on the outer panel which extended around the inner panel. At the bottom of the door there was a gap where the outer panel and inner panel were joined together by the hem flange. The gap

extended across the entire bottom of the door. At the bottom of door there were small drain holes. However, the drain holes were above the hem flange and gap.

Because it was not possible to locate the drain holes above the gap, it was not possible to remove all of the oil from the bare inner surfaces at the bottom of the door. Some of the oil collected in the gap and remained on the bare steel surfaces. Another condition which caused the corrosion problem was that a very thin coating was required because it had to be sprayed inside of the doors. Also, the coating needed to spread over the entire surface of the metal. Thin coatings tended to sag. Thick coatings were difficult to apply and had unacceptable drying times.

Chlorinated solvents (e.g. perchloroethylene) are very powerful solvents for dissolving oil. They also evaporate very quickly. There are no other solvents which I am aware of which are more effective in penetrating oil and evaporate more quickly than the chlorinated solvents. I discovered that when a chlorinated solvent was added to the coating, it made a major improvement. It quickly penetrated the oil on the bare steel at the bottom of the doors and evaporated quickly. This caused the coating to immediately contact the surface of the bare metal and to set up without sagging. Adherence of the coating was significantly improved.

The surfactant (Igepal) is used in the coating because it improves its spreadibility. It is important to cover all of

the bare metal. Also, the improved spreadability helps a worker to properly apply the coating because it is difficult to see the entire inside surface of a door when the coating is sprayed into the door.

The chelating agent (Quadrol) further improves the adherence of the coating to the bare metal. I discovered this when I was developing the coating. I also found that it is effective for preventing materials, and in particular aluminum and zinc, from settling in the coating before it is applied to the doors.

The mineral spirits act as a carrier for the other materials. They are much lower in cost than the perchloroethylene. They are used to dissolve the wax when the the wax is heated. The method of preparing the coating is disclosed in my patent.

From 1974 through 1979 I experimented with a welded zinc coating which I was informed General Motors needed. A number of samples were prepared and tested at the Fisher Body Corrosion Lab. This work did not result in a commercially successful coating. However, some of the results were incorporated into the '036 Patent.

The '036 Patent covers an anti-corrosion coating containing a wax, an aluminum or zinc paste, a chlorinated solvent, barium sulfonate, an aromatic hydrocarbon resin, chlorinated rubber, an aromatic hydrocarbon solvent and mineral spirits.

In late 1978, Mr. Latsko, Director of the Fisher Body Corrosion Lab, called me on the telephone and requested a sample of my wax coating for a test. Mr. Latsko told me the testing was to establish that my coating was suitable for the inside of vehicle doors. He also told me that he knew that my product should be able to meet their requirements. In February, 1979, Daniel Hogan, a Fisher Body test engineer, told me that my coating was the only coating that passed all the corrosion tests. Afterwards, I continued to experiment and improve the coating. In May of 1980, I had a heart attack and was hospitalized. In August, 1980, I returned to work and delivered two gallons of my coating for a final test to John Bubak, a Fisher Body purchasing agent. In October, 1980, Mr. Bubak informed me that my coating didn't pass their tests. Mr. Bubak also informed me that I would not have received a purchasing order even if the coating had passed because I was not a coating manufacturer.

The coating which is described and claimed in the '036 Patent was developed to meet corrosion requirements, given to me by Fisher Body Corrosion engineers.

The aluminum paste was added to the coating in late 1978 to meet the requirement of General Motors Material Specification 998-1128 of a coating containing aluminum. The barium sulfonate keeps the coating soft and improves corrosion protection. The wax and chlorinated solvent are used for the reasons previously given. The chlorinated rubber has a high resistance to acids

and alkalies. It is needed to pass the General Motors car detergent solution test in which a coated test sample is immersed in a strong alkaline solution. The chlorinated rubber also improves the resistance to salt spray. The aromatic hydrocarbon solvent is used to dissolve the resin and is present in the aluminum paste; the mineral spirits acts as a carrier.

The many tests which I have conducted convince me that all of these ingredients are needed in a coating applied to bare steel surfaces, if the coating is to meet General Motor's corrosion tests.

Nicolas Kaliardos

Subscribed and sworn to before me
this 19th day of December, 1991

CARMELINA MULLANE
Notary Public, Oakland County, MI
My Commission Expires Sept. 17, 1993

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC., jointly and severally,

Defendants.
_____/

Civil Action
Case No. 88-CV-73729-DT

Hon. Paul V. Gadola

AFFIDAVIT OF DAVID W. BYRD

STATE OF MICHIGAN)
) SS:
COUNTY OF OAKLAND)

I am the Laboratory Director of the Absolute Analytical Laboratory, Inc. at 1030-D North Crooks Road, Clawson, Michigan. The Absolute Analytical Laboratory is a chemical laboratory which specializes in the analyses of inorganic and organic materials. I have Bachelors and Masters degrees in the Biological Sciences and a Masters Degree in Chemical Engineering. My education and experience are summarized in a Resume which is attached and marked Exhibit "A".

Samples of wax anti-corrosion coatings were taken from the interiors of 1984 Buick Skyhawk and 1989 Cadillac Eldorado doors and analyzed at the Absolute Analytical Laboratory. I am intimately familiar with the procedures and results of the

analyses because I have personally conducted the analyses.

The results of the analyses are attached and marked "Attachment B" (1984 Skyhawk) and "Attachment C" (1989 Eldorado). A sample of the 1989 Eldorado coating was forwarded to Charles Evans and Associates, Redwood City, California for further analysis. Charles Evans and Associates is a well known analytical laboratory which specializes in materials characterization. A summary of the Charles Evans lab analysis is attached and marked "Exhibit "D".

I am familar with U.S. Patent No. 3,959,530 and U.S. Patent No. 4,356,036, having reviewed the patents, including their claims. I have also reviewed Daubert Industries, Inc. documents relating to the compositions of Daubert wax-type anti-corrosion coatings Nox Rust X-151 and Nox Rust X-170. The documents disclose that Nox Rust X-151 corresponds to General Motors material specification 998-1228 and that Nox Rust X-170 corresponds to General Motors material specification 998-2150.

Claim 1 of U.S. Patent No. 3,959,530 defines a wax coating containing a wax residue such as paraffin and microcrystalline wax; perchloroethylene; a petroleum distillate having a boiling point ranging between 350^{o} and 380^{o}F, a nonionic surfactant such as nonylphenoxypoly(ethyleneoxy)ethanol and a small amount of [N,N,N',N'-tetrakis(2-hydroxypropyl) - ethylenediamine].

After reviewing the results of the laboratory analysis of the 1984 Skyhawk coating and the Daubert documents, I am of

the opinion that each of the ingredients of claim 1 of U.S. Patent No. 4,356,036 is present in Daubert Nox Rust X-151. This opinion is based on the following. Daubert has admitted in its documents that Nox Rust X-151 contains microcrystalline wax; an aromatic hydrocarbon resin having a softening point, R and B, of 70° C. - 140° C"; barium sulfonate; an aromatic hydrocarbon solvent; a hydrocarbon solvent, and mineral spirits. My analysis of the 1984 Buick Skyhawk coating disclosed the presence of zinc; and chlorinated rubber having a combined chlorine content of at least 66% (i.e. Parlon).

After reviewing the results of the laboratory analyses of the 1989 Cadillac Eldorado coating at my laboratory and at the Charles Evans laboratory and the Daubert documents, I am of the opinion that each of the ingredients or their equivalents of U.S. Patent No. 3,959,530 is present in Daubert Nox Rust X-170. This opinion is based on the following. Daubert has admitted in its documents that Nox Rust X-170 contains wax and a petroleum distillate having a boiling point ranging between 350° and 380°F. My analysis of the Eldorado coating disclosed the presence of a surfactant in the 1989 Eldorado coating, i.e. a dispersent equivalent in action and function to a surfactant such as nonylphenoxypoly(ethyleneoxy)ethanol. My analysis of the Eldorado coating also disclosed the presence of a methlyene chloride, a chlorinate solvent equivalent in action and function to perchloroethylene. The Charles Evans analysis disclosed the presence of a chelating agent, i.e. a material equivalent in

action and function to [N,N,N',N' -tetrakis(2-hydroxypropyl) ethylenediamine].

L/S *
David W. Byrd

Subscribed and sworn to before me
this 20th day of December, 1991

*Signed original filed with Court December 20, 1991 in Plaintiff's Response to Motion of Daubert Industries, Inc. for Summary Judgment of Non-Infringement

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC., jointly and severally,

Defendants.
_____/

Civil Action
Case No. 88-CV-73729-DT

Hon. Paul V. Gadola

AFFIDAVIT OF DR. PAUL S. EPSTEIN

STATE OF MICHIGAN)
) SS:
COUNTY OF WASHTENAW)

I have a Doctor of Philosophy Degree. My education and experience are summarized in the resume attached hereto. During 1990 I was the Director of the Laboratory Services Canadian Operations, Clayton Environmental Consultants, Inc., Windsor, Ontario, Canada.

In March, 1990, Daryl P. Strandbergh, Manager of Organic Laboratory Services, Clayton Environmental Consultants, Inc., Novi, Michigan, requested our laboratory to analyse a sample of a wax coating designated as 998-1128 for perchloroethylene. Perchloroethylene is a widely used solvent which evaporates very quickly when exposed to air. Consequently, we were not able to quantify the amount of

perchloroethylene in the original coating.

The test was conducted by Dr. James Johnson, our most highly qualified chemist. I am intimately familar with the method of testing and have personally reviewed the test records and results. The sample was first analyzed by gas chromotography using a heated head space and an electron capture detector. This test identified perchloroethylene in the sample. The sample was then analyzed using GC/MS with selected ion monitoring (SIM). This is a very sophisticated and specific test for identifying chemical compounds. The GC/MS-SIM test analysis positively confirmed the presence of perchloroethylene in the sample.

The amount of perchloroethylene in the sample could not have resulted from airborne contamination of perchloroethylene in clothing, water or other materials.

Paul S. Epstein Ph.D.

Dr. Paul S. Epstein

Subscribed and sworn to before me
this 27th ~~day of~~ December, 1991

Alex T Rhodes

ALEX RHODES
Notary Public, Oakland County, MI
My Commission Expires April 26, 1992

Acting in Washtenaw County

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

DECEMBER 30,1991

ALEX RHODES,P.C.
30100 TELEGRAPH RD.,STE. 460
BINGHAM FARMS,MI 48025
ATTN:ALEX RHODES

RE:ELECTRON SPECTROSCOPY FOR CHEMICAL ANALYSIS (ESCA) LABORATORY RESULTS WITH RESPECT TO PATENTS #3,959,530 & 4,356,036. 1989 ELDORADO FRONT PASSENGER DOOR.

Coating materials obtained from the bottom inner surfaces of a 1989 Eldorado door were sent to Charles Evans and Associates (Redwood, Ca) to determine the presence of zinc, organohalides, and chelating agents. The following is a summary and discussion of the test results from the ESCA analysis. The ESCA results indicate that zinc, chlorinated organic, sulfur oxide(s), and chealating functional groups were found to be present in the referenced coating.

Zinc was detected using ESCA at approximately 3.5 %. The Eldorado coating was found to contain zinc in our laboratory using Atomic Absorption Spectrophotometry (reports 91.01023.221 and 91.01023.228).

The presence of ligands which are the functional groups of chelating agents were found. Several ligands were detected including carbonyl, carboxylate, amines and hydroxyl functional groups (see exhibit 106a). All of the functional groups detected are capable of forming a complex or coordination compound by sharing electron density with with metal ions.

The test data also indicates the presence of organochlorine compounds. With respect to the patents, the presence of chlorinated solvents and chlorinated polymers would be indicated by the presence of organochlorine compounds. This is consistent with the chlorinated solvent methylene chloride which was found in the Eldorado coating (report 91.01023.228). The presence of other organochlorine compounds such as chlorinated rubbers is indicated by the elevated levels of organochlorine compounds (~ 0.3 %) relative to the trace levels of methylene chloride (< 0.00001 %).

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

ALEX RHODES,P.C.
LAB I.D.# 91/01023/229

ESCA analysis also detected the presence of sulfur oxides. ulfur oxides would be consistent with the presence of sulfonate ompounds.

A tabular summary of data taken together from ESCA analysis erformed by Charles Evans and Associates and our laboratory are ummarized on page three of this report. We note that much of the data btained here is not consistent with the MSDS which we have available or these products.

Absolute Analytical Laboratory,

David W. Burd
Laboratory Director

aka
enclosures

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

ALEX RHODES, P.C.
LAB I.D.# 91/01023/229

TABLE OF ANALYTICAL RESULTS
1989 ELDORADO RIGHT PASSENGER DOOR

PARAMETER	METHOD
ZINC	Flame Atomic Absorption Spectrophotmetry
CHLORINATED SOLVENT (METHYLENE CHLORIDE)	Electron Spectroscopy for Chemical Analysis Static Headspace Gas Chromatography Photoionization and Electrolytic Conductivity Detector
'RFACTANTS	Electron Spectroscopy for Chemical Analysis Methylene Blue Active Substances
LIGAND FUNCTIONALITIES (CHELATING FUNCTIONS)	Electron Spectroscopy for Chemical Analysis
SULFUR OXIDIZED FORM	Electron Spectroscopy for Chemical Analysis

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC., jointly and severally,

Defendants.
_____/

Civil Action
Case No. 88-CV-73729-DT

HON. Paul V. Gadola

AFFIDAVIT OF DARYL P. STRANDBERGH

STATE OF MICHIGAN)
) SS
COUNTY OF OAKLAND)

I am the Manager of Organic Laboratory Services, Clayton Environmental Consultants, Inc., Novi, Michigan. Clayton Environmental Consultants, Inc. provides analytical chemistry services relating to industrial hygiene and the environment. I have Bachelor in Chemistry and MBA Degrees from the University of Michigan, Dearborn.

In January, 1990, the Clayton Novi laboratory analysed a sample of General Motors 998-1128 coating and a sample from a 1984 Oldsmobile Cierra. Testing at the Novi laboratory did not reveal the presence of tetrachloroethene (also known as tetrachloroethylene).

The remainder of the 998-1128 sample was sent to our Windsor, Canada laboratory for further analysis (Note: there was insufficient Sample Cierra for re-analysis). Testing at the Windsor laboratory was conducted by Dr. Paul S. Epstein and Dr. James Johnson. Analysis of Sample 998-1128 was performed at the Windsor laboratory by GC/MS using selected ion monitoring (SIM). The GC/MS-SIM employed parameters specific for tetrachloroethene. This procedure provided greater sensitivity for tetrachloroethene. The presence of tetrachloroethene in the 998-1128 sample was positively confirmed at the Windsor laboratory using GC/MS and the static headspace technique. I do not disagree with the results of the Windsor laboratory.

The analysis of mixtures may require the application of alternate test methods to determine whether an ingredient is present in a mixture. It is not uncommon for a test method to be inadequate for detecting a specific ingredient because of limitations of the test method.

A copy of the Clayton Environmental laboratory final report is attached.

Daryl P. Strandbergh

Subscribed and sworn to before me
this 27th day of December, 1991

ALEX RHODES
Notary Public, Oakland County, MI
My Commission Expires April 25, 1992

001186

Clayton Environmental Consultants, Inc.

22345 Roethel Drive • Novi, Michigan 48050 • (313) 344-1770

April 5, 1990

Mr. Alex Rhodes, Esq.
24700 Northwestern Highway
Suite 412
Southfield, MI 48075

Clayton Project No. 62922-17

Dear Mr. Rhodes:

The following is our report for Samples 998-1128 and Cierra (VIN 1C3AJ19E2DD406799) Wax Scraping, received on January 2, 1990, for qualitative analysis. The purpose of this analysis was to determine the presence of tetrachloroethene and volatile aromatic hydrocarbons in both samples.

The analysis was performed by gas chromatography/mass spectrometry (GC/MS) using dynamic headspace analysis and general scanning techniques. A portion of sample was weighed and placed in a glass vessel. The vessel was sealed and heated to 90 °C. Helium was passed through the glass vessel at 60 cubic centimeters/minute for 14 minutes. The effluent was collected by cryogenic focusing using liquid nitrogen (-150 °C) to trap the purgeable compounds. After purging, the cryogenic trap was rapidly heated with a helium flow to transfer the collected organics into a GC/MS for analysis. Using the dynamic headspace technique, aromatic compounds were detected in both samples. Tetrachloroethene was not detected. The results are provided in the attached table.

Based on our discussions of the data generated from the GC/MS analysis of Samples 998-1128 and Cierra, Sample 998-1128 was sent to our Windsor laboratory for static headspace analysis of tetrachloroethene by gas chromatography using an electron capture detector (GC/ECD). The GC/ECD analysis was performed to improve analytical sensitivity for tetrachloroethene. Insufficient sample remained to reanalyze Sample Cierra. A 0.80-gram portion of Sample 998-1128 was placed in 40-cc bottle and sealed with a Teflon liner. The bottle was heated to 80 °C for 30 minutes and a portion of the headspace was injected onto the GC/ECD for analysis. Tetrachloroethene was detected based on the static headspace GC/ECD analysis. The results are provided in the attached table.

Confirmation of tetrachloroethene in Sample 998-1128 was performed by GC/MS using selected ion monitoring (SIM). The GC/MS-SIM technique employed parameters specific for tetrachloroethene, which provided greater sensitivity for tetrachloroethene. Tetrachloroethene was positively confirmed using GC/MS and the static headspace technique.

We appreciate the opportunity to be of assistance to you. If you have any questions, please call me at (313) 344-2650.

Sincerely,

Daryl P. Strandbergh
Director, Organic Laboratory Services

DPS/dp
Attachment

001187

Analytical Results
for
Mr. Alex Rhodes, Esq.

Clayton Project No. 62922-17

Dynamic Headspace		Static Headspace*	
GC/MS Sample 998-1128	GC/MS Sample Clems	GC/ECD Sample 998-1128	GC/MS (SI Sample 998-1128
Ethyl benzene	Sulfur dioxide	Tetrachloroethene	Tetrachloroeth
Toluene	Acetaldehyde		
Xylenes	Heptanal		
Methyl cyclohexane	Benzaldehyde		
Dimethyl cyclohexanes	Trimethyl benzene		
Decane	Octanal		
Undecane	1-Phenyl ethanone		
Additional unknown hydrocarbons	Nonanal		
	Dodecane		
	Decanal		

*Analyses specific for tetrachloroethene only.

001188

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC., jointly and severally,

Defendants.
_____/

Civil Action
Case No. 88-CV-73729-DT

Hon. Paul V. Gadola

AFFIDAVIT OF DAVID W. BYRD

STATE OF MICHIGAN)
) SS:
COUNTY OF OAKLAND)

David W. Byrd, being duly sworn, deposes and says:

1. That I have an M.S. degree in Biological Science, Wayne State University, post graduate credits in chemistry, and am a member in good standing of The American Chemical Society, ANACHEM and the Chromatography Society.

2. That I am the owner of Absolute Analytical Laboratory, 1030-D Crooks Road, Clawson, Michigan, which is in the business of trace organic and inorganic chemical analyses of materials.

3. That from December, 1987 to the present, I conducted laboratory analyses at the Absolute Analytical

Laboratory of samples of a BASF anti-corrosion coating and scrapings of this coating taken from General Motors' vehicles.

4. That I reviewed BASF and General Motors documents, technical literature and deposition testimonies of BASF and General Motors employees relating to the BASF S51Z001 coating.

5. That I also reviewed U.S. Patents Nos. 3,959,530 and 4,356,036, including the specifications and claims.

6. That after reviewing the above information, it is my opinion that the BASF anti-corrosion coating contains all of the ingredients or well known equivalents of the ingredients specified in claim 1 of U.S. Patent No. 3,959,530 and claim 1 of U.S. Patent No. 4,356,036.

Further deponent sayeth not.

David W. Byrd

Subscribed and sworn to before me
this 2nd day of January, 1992

Notary Public, Oakland County, MI
My Commission Expires May 17, 1993

000120

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC., jointly and severally,

Defendants.
_____/

Civil Action
Case No. 88-CV-73729-DT

Hon. Paul V. Gadola

AFFIDAVIT OF DAVID W. BYRD

STATE OF MICHIGAN)
) SS:
COUNTY OF OAKLAND)

I am the Laboratory Director of the Absolute Analytical Laboratory, Inc. at 1030-D North Crooks Road, Clawson, Michigan. The Absolute Analytical Laboratory is a chemical laboratory which specializes in the analyses of inorganic and organic materials. I have Bachelor and Master degrees in the Biological Sciences. My education and experience are summarized in a Resume which is attached and marked Byrd Exhibit "A".

A sample of General Motors 998-2150 wax type anti-corrosion coating was taken from a 1989 Cadillac Eldorado at the Absolute Analytical Laboratory and analyzed to identify whether certain ingredients were in the coating. A portion of

the door with the coating in place was removed at our laboratory and sent to Charles Evans and Associates, Inc. laboratory in Redwood City, California, which specializes in material characterization.

Our analysis detected the presence of wax, zinc, methylene chloride, and chlorinated organic compounds. Zinc was detected using Flame Atomic Absorption Spectrophotrometry; methylene chloride was detected using Static Headspace Gas Chromatography with an Electrolytic Conductivity Detector; surfactants were detected using Methylene Blue Active Substances. A summary of our test results is attached and marked Byrd Exhibit "B".

The sample which was forwarded to Charles Evans and Associates was analyzed using the method of Electron Spectroscopy for Chemical Analysis (ESCA). The Charles Evans laboratory detected zinc, ligands (including carbonyl, carboxalate, amines and hydroxyl functional groups), and organochloride compounds. These results are consistent with the presence of a chelating agent, chlorinated compounds and zinc in the sample.

I have reviewed H.B. Fuller Material Safety Data Sheets, a production batch card, a Code Sheet, and supplier information of the ingredients for their wax-type anti-corrosion coating WC-2291 which corresponds to General Motors anti-corrosion coating 998-2150. The H.B. Fuller documents do not disclose all of the ingredients of the coating.

I have also reviewed U.S. Patent Nos. 3,959,530 and U.S. 4,356,036, including the claims. Claim 1 of U.S. Patent No. 3,959,530 defines a wax coating comprising a wax residue such as paraffin and microcrystalline wax; perchloroethylene; a petroleum distillate having a boiling point ranging between 350° and 380°F, a nonionic surfactant such as nonylphenoxypoly (ethyleneoxy)ethanol and a small amount of [N,N,N',N'-tetrakis(2-hydroxypropyl) -ethylenediamine].

Claim 1 of U.S. Patent No. 4,356,036 defines a wax coating comprising a mixture of aluminum paste or zinc paste containing aluminum or zinc flakes and a solvent, microcrystalline wax, aromatic hydrocarbon resin having a softening point, R and B, of 70° C. - 140° C., chlorinated rubber having a combined chlorine content of at least 66%, neutral barium sulfonate, a chlorinated solvent, an aromatic hydrocarbon solvent and mineral spirits.

After reviewing the results of the laboratory analyses of the 1989 Cadillac Eldorado coating at my laboratory and at the Charles Evans laboratory and the H.B. Fuller documents, I am of the opinion that each of the ingredients or their equivalents of U.S. Patent No. 3,959,530 is present in H.B. Fuller anti-corrosion coating WC-2291. H.B. Fuller has admitted in its documents that its coating contains wax and a petroleum distillate having a boiling point ranging between 350° and 380°F.

My analysis of the Eldorado coating disclosed the

presence of a surfactant in the 1989 Eldorado coating, i.e. a dispersent equivalent in action and function to a surfactant such as nonylphenoxypoly(ethyleneoxy)ethanol; methlyene chloride, and a chlorinated solvent equivalent in action and function to perchloroethylene. The Charles Evans analysis disclosed the presence of chelating agents, i.e. substances equivalent in action and function to [N,N,N',N' -tetrakis (2-hydroxypropyl)ethylenediamine].

Although many of the ingredients of claim 1 of U.S. Patent No. 4,356,036 were identified, sufficient information is not available to form an opinion of whether H.B. Fuller WC-2291 infringes claim 1 of U.S. Patent No. 4,356,036.

David W. Byrd

Subscribed and sworn to before me
this 2nd day of January, 1992

CAROLINA MEILANE
Notary Public, Oakland County, MI
My Commission Expires Jan. 17, 1996

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

JULY 14,1992

ALEX RHODES,P.C.
30100 TELEGRAPH RD.,STE. 460
BINGHAM FARMS,MI 48025

RE:

SAMPLE DESCRIPTION	:H.B. FULLER FORMULATION WC-2291 & WC-2291-P
ANALYSIS REQUESTED	:AROMATIC AND CHLORINATED CMPDS. HHS/GC-PID-ELCD
PURCHASE ORDER	:VERBAL
LABORATORY #	:92.01023.266

Samples of the referenced H.B.Fuller products were analysed for the presence of aromatic hydrocarbons and volatile chlorinated solvents. Our test results are tabulated on the attached pages.

If you have questions or are in need of additional service please feel free to contact us at your earliest convenience.

Absolute Analytical Laboratory,

David W. Byrd
Laboratory Director

AR1/92

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

CLIENT :ALEX RHODES,P.C.
SAMPLE DESCRIPTION :H.B. FULLER FORMULATION WC-2291 & WC-2291-P
ANALYSIS REQUESTED :AROMATIC AND CHLORINATED CMPDS. HHS/GC-PID-ELCD
LABORATORY # :92.01023.266

ANALYTICAL SECTION

1.0 SAMPLE PREPARATION
1.1 SAMPLE DESCRIPTION TABLE

SAMPLE DESCRIPTION

1 QUART CONTAINER MARKED "WC-2291"

1 QUART CONTAINER MARKED "WC-2291-P"

1.1.2 The wax coating samples (ca. 1 gram) were placed into 40 ml vials with a silicone-teflon septa for head space sampling. The containerized samples were incubated at 90 C for approximately one hour. Desorbed volatiles were obtained by puncturing the container and obtaining a sample of the headspace volume which was subsequently injected into the gas chromatograph. The operational conditions of the gas chromatograph were:

T(inject) : COC C T(column) : program T(detect): 200 C
T(initial): 40 C T(rate) : 5 C T(final) : 150 C
T(hold) : 5 MIN Flow mlsec-@C:8.0
Detector 1: PID Detector 2: HECD
Column: 530 um x 30 m. 3.0 um DB624.
The resulting chromatograms were compared to standards of aromatic hydrocarbons and chlorinated hydrocarbons for identification purposes.

2.0 TEST RESULTS
2.1 TABULATED DATA FOR AROMATIC HYDROCARBONS

SAMPLE DESCRIPTION	AROMATIC COMPOUNDS	COMMENTS
WC-2291	DETECTED	Benzene, toluene, ethylbenzene, xylenes
WC-2291-P	DETECTED	Benzene, toluene, ethylbenzene, xylenes

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

CLIENT :ALEX RHODES,P.C.
SAMPLE DESCRIPTION :H.B. FULLER FORMULATION WC-2291 & WC-2291-P
ANALYSIS REQUESTED :AROMATIC AND CHLORINATED CMPDS. HHS/GC-PID-ELCD
LABORATORY # :92.01023.266

2.2 TABULATED DATA FOR CHLORINATED HYDROCARBONS

SAMPLE DESCRIPTION	CHLORINATED COMPOUNDS	COMMENTS
WC-2291	DETECTED	1,1-dichloroethene
WC-2291-P	DETECTED	1,1-dichloroethene

3.0 DISCUSSION
3.1 Our tests show that aromatic hydrocarbons such as benzene, toluene, ethylbenzene and xylenes are found in both the Fuller formulation designated "WC-2291" and "WC-2291-P". Additionally, our test show that 1,1-dichloroethene, a volatile chlorinated hydrocarbon, are present in the reference wax coating materials.

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

March 06,1992

ALEX RHODES,P.C.;
30100 TELEGRAPH RD.,STE. 460
BINGHAM FARMS,MI 48025
ATTN:ALEX RHODES

RE:
PROJECT :KALIARDOS v. GENERAL MOTORS et al.
ANALYSIS REQUESTED :COMMENTS ON MOTION
PURCHASE ORDER :VERBAL
LABORATORY # :92.01023.241

The following is a responce to the Motion to Strike Affidavit of David W. Byrd.

1.0 THE CHARLES EVANS SCOPE OF WORK

1.1 The motion which you have provided covers numerous references to test parameters which were not included in the scope of work which had been requested of Charles Evans and Associates. The specific items which were requested were the presence of ligands or chealating compounds. This is sufficiently clear from my communication to Dr. Edgell dated December 9,1991 which is in your possession. Because of the limitations of the test method we did not request that ESCA be used to:

1. Determine the presence of methylene chloride.
2. Determine the presence of surfactants.
3. Identify a specific chealating agent.
4. Determine specific molecular forms of organochlorine compounds detected.

The nature of the defendants queries directed during Dr. Edgell's depostion reflect a lack of understanding of the use of the ESCA test method.

1.2 After completion of the testing Dr. Edgell sent a fax of the ESCA laboratory results. I called Dr. Edgell and discussed the results. At that time I confirmed that ligands were detected. The data on the carbon bonding clearly denotes the presence ligands namely carbonyl, carboxylate amd amines. Further the test showed that organochlorine compounds, sulfur oxides and zinc were detected. This data was used to augment other laboratory data obtained in our laboratory (refer to report 91.01023.229). ESCA was used as exclusive evidence for the presence of a chealating agent.

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

CLIENT :ALEX RHODES,P.C.
SAMPLE DESCRIPTION :KALIARDOS v. GENERAL MOTORS et al.
ANALYSIS REQUESTED :COMMENTS ON MOTION
LABORATORY # :92.01023.241

1.3 The fact that zinc is in the oxidized form would be consistent with the common usage of zinc as a sacrificial metal which would be oxidized (rusted) instead of the metal of the door. In this perspective it is consistent with the intended application of zinc as a constituent of an anticorrosion product. The fact that ESCA only provides surface information is again consistent and predicted with the form of zinc found on the surface of the coating.

2.0 THE PRESENCE OF LIGANDS
2.1 Formualtions which use metallosulfonates, i.e. calcium sulfonate, barium sulfonate, etc., constitute metal complexes which make use of ligands to complex the metal. Calcium sulfonate is listed as an ingredient in H.B. Fuller's product WC-2291.

3.0 THE PRESENCE OF SURFACTANTS
3.1 Tests performed in our laboratory (91.01023.229) show that surfactants are present in the anticorrosion sample obtained from the door of a 1989 Eldorado.
3.1 Calcium sulfonate is classified as surfactant. Calcium sulfonate is listed as an ingredient in H.B. Fuller's product WC-2291. See summary report on BASF ANTI-CORROSION WAX COATING S51Z001 (report 90.01023.xxx).

If you have questions or are in need of additional service please feel free to contact us at your earliest convenience.

Absolute Analytical Laboratory,

David W. Byrd
Laboratory Director

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC., jointly and severally,

Defendants.

Civil Action
Case No. 88-CV-73729-DT

HON. PAUL V. GADOLA

AFFIDAVIT OF JAMES P. JOHNSON, PH.D.

COMMONWEALTH OF CANADA)
) SS:
PROVINCE OF ONTARIO)

James P. Johnson, being first duly sworn, deposes and says:

1. I make this affidavit on my own personal knowledge.

2. I am the Supervisor, Laboratory Services, Clayton Environmental Consultants, Canadian Operations, 949 McDougall Ave., Windsor, Ontario, Canada.

3. I have a Ph.D. degree in Chemistry which was awarded to me by McMasters University, Hamilton, Ontario, Canada in 1983.

4. I am experienced in the development of analytical methods for chemical analysis. I am also experienced in modern instrumental methods of chemical analysis, including, gas chromatography and mass spectrometry. I have also used USPEA, ASTM, NIOSH, MOE and other analytical methods to meet clients' needs.

5. In February, 1990 I was employed at Clayton Environmental Consultants, Canadian Operations. My position was Technical Supervisor, Laboratory Services.

6. On February 7, 1990 I was given a sample of No. 794542 (Clayton Project No. 62922-17) by Laboratory Supervisor Dr. Paul Epstein with instructions to analyse the sample for the presence of tetrachloroethene. (commonly referred to as perchloroethylene).

7. The sample 794542 was a viscous liquid similar in appearance to plastic model silver paint.

8. On March 1, 1990, I personally performed an analysis of the sample using the method of gas chromotography/heated headspace/ECD.

9. During the analysis, the air quality of the laboratory was analyzed and found to be free of contaminants.

10. I placed .8 grams of the sample in a sealed 40 ml. glass bottle and heated the sample at 80 degrees centigrade for thirty minutes.

11. The sample solidified during the heating.

12. After heating the sample, I removed 1 microliter from the head space with a syringe and injected the 1 microliter into a gas chromatograph. The response was high and exceeded the linear calibration limit of the scale.

13. I then removed 1/2 microliter with the syringe and injected it into the gas chromatograph and obtained a reading on the scale. I repeated the procedure 3 times by removing various amounts of the sample and injecting it into the gas chromatograp. Each injection detected tetrachloroethene in the sample.

14. After the analysis of the sample using the gas chromatograph was completed, the solidified sample was analyzed using a gas chromatograph/mass

spectrometer (GC/MS) with selective ion monitoring. Dr. Epstein and myself were present during the analysis. The results positively confirmed that tetrachloroethene was an ingredient of the sample.

15. I have reviewed an affidavit of Dr. Paul Epstein, a copy of which is attached. I find this affidavit to be true.

James P. Johnson, Ph.D.

Subscribed and sworn to before me
at Clayton Environmental Consultants,
Canadian Operations, 949 McDougall Ave.
Windsor, Ontario, Canada

this _____ day of May, 1992

_____

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, NATIONAL STARCH & CHEMICAL CORPORATION, and BEAZER EAST, INC., jointly and severally,

Defendants.

Civil Action
Case No. 88-CV-73729-DT

Hon. Paul V. Gadola

AFFIDAVIT OF FRANKLIN C. SCHOONOVER

STATE OF MICHIGAN)
) SS
COUNTY OF OAKLAND)

Franklin C. Schoonover, being first duly sworn, deposes and says:

1. I have a degree in manufacturing engineering from the General Motors Institute, Flint, Michigan.

2. I am experienced in automobile engineering and manufacturing, having been employed in the automobile industry for over thirty (30) years.

3. My experience includes six (6) years in manufacturing, General Motors Fisher Body Division, Cadillac Plant, Detroit, Michigan. This experience includes one (1) year as a production supervisor and one (1) year as a general foreman

in the paint department.

4. My experience also includes twenty-five (25) years at the Ford Motor Company, Dearborn, Michigan. This experience included vehicle design engineering, management and product planning.

5. My job titles at Ford included Product Design Engineer, Manager of the Safety and Services Department, and Chief Product Planning Analyst for safety, damageability and corrosion. I was also represented Ford legal representative on the Damageability Committee of the SAE (Society of Automotive Engineers).

6. On May 31, 1989, I examined used General Motors' vehicles at Highway Auto Parts, 29231 Groesbeck Highway (M-97), Roseville, Michigan. The purpose of my examination was to identify General Motors' vehicles which were in an "as manufactured" condition for obtaining samples of anti-corrosion coatings.

7. Present, during my examination, were Nicolas Kaliardos and David W. Byrd.

8. I examined the vehicles for evidence of repairs, removal or penetration of vapor barriers, drill holes and plugs for applying after-market coatings, paint mis-matches of top coats and primers, and traces of other coatings on top coats. If any such evidence existed, I rejected the vehicles as being unsuitable.

9. I identified as being in an "as manufactured"

condition, a 1984 Buick Skyhawk (Vehicle Identification No. 1G4AS2703EK526551) and a 1983 Oldsmobile Cierra (Vehicle Identification No. 1G3AJ19E2DD406799).

10. Mr. David W. Byrd took samples of a wax coating from the interior of the Oldsmobile Cierra door in my presence for analysis at the Absolute Analytical Laboratory, Clawson, Michigan.

11. One of the 1984 Buick Skyhawk doors was removed from the vehicle in my presence by a Highway Auto Parts' employee. I personally delivered the door to the Absolute Analytical Laboratory, Clawson, Michigan.

12. If called to testify at trial, I will testify that the anti-corrosion coatings on the interior surfaces of the 1983 Oldsmobile Cierra and the 1984 Buick Skyhawk were part of the original equipment of the vehicles.

Further Deponent sayeth not.

Franklin C. Schoonover

Subscribed and sworn to before me
this 21st day of August, 1992.

Carmelina Mullane

Carmelina Mullane, Notary Public,
Oakland County, Michigan
My Commission Expires: March 17, 1993

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

SEPTEMBER 17,1992

ALEX RHODES,P.C.
30100 TELEGRAPH RD.,STE. 460
BINGHAM FARMS,MI 48025

RE:
SAMPLE DESCRIPTION :H.B. FULLER FORMULATION WC-2291 & WC-2291-P
ANALYSIS REQUESTED :AROMATIC AND CHLORINATED CMPDS.
HHS/GC-PID-ELCD

PURCHASE ORDER :VERBAL
LABORATORY # :92.01023.266.REPRINT.

Samples of the referenced formulations were analysed for the presence of aromatic hydrocarbons and volatile chlorinated solvents. Our test results are tabulated on the attached pages.

If you have questions or are in need of additional service please feel free to contact us at your earliest convenience.

Absolute Analytical Laboratory,

David W. Byrd
Laboratory Director

AR1/92

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

CLIENT :ALEX RHODES,P.C.
SAMPLE DESCRIPTION :H.B. FULLER FORMULATION WC-2291 & WC-2291-P
ANALYSIS REQUESTED :AROMATIC AND CHLORINATED CMPDS.
HHS/GC-PID-ELCD
LABORATORY # :92.01023.266

ANALYTICAL SECTION

1.0 SAMPLE PREPARATION
1.1 SAMPLE DESCRIPTION TABLE

SAMPLE DESCRIPTION

1 QUART CONTAINER MARKED "WC-2291"

1 QUART CONTAINER MARKED "WC-2291-P"

1.1.2 The wax coating samples (ca. 1 gram) were placed into 40 ml vials with a silicone-teflon septa for head space sampling. The containerized samples were incubated at 90 C for approximately one hour. Desorbed volatiles were obtained by puncturing the container and obtaining a sample of the headspace volume which was subsequently injected into the gas chromatograph. The operational conditions of the gas chromatograph were:
T(inject) : COC C T(column) : program T(detect): 200 C
T(initial): 40 C T(rate) : 5 C T(final) : 150 C
T(hold) : 5 MIN Flow mlsec-@C:8.0
Detector 1: PID Detector 2: HECD
Column: 530 um x 30 m. 3.0 um DB624.
The resulting chromatograms were compared to standards of aromatic hydrocarbons and chlorinated hydrocarbons for identification purposes.

2.0 TEST RESULTS
2.1 TABULATED DATA FOR AROMATIC HYDROCARBONS

SAMPLE DESCRIPTION	AROMATIC COMPOUNDS	COMMENTS
WC-2291	DETECTED	Benzene, toluene, ethylbenzene, xylenes
WC-2291-P	DETECTED	Benzene, toluene, ethylbenzene, xylenes

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

CLIENT :ALEX RHODES,P.C.
SAMPLE DESCRIPTION :H.B. FULLER FORMULATION WC-2291 & WC-2291-P
ANALYSIS REQUESTED :AROMATIC AND CHLORINATED CMPDS.
HHS/GC-PID-ELCD
LABORATORY # :92.01023.266

2.2 TABULATED DATA FOR CHLORINATED HYDROCARBONS

SAMPLE DESCRIPTION	CHLORINATED COMPOUNDS	COMMENTS
WC-2291	DETECTED	1,1-dichloroethene
WC-2291-P	DETECTED	1,1-dichloroethene

3.0 DISCUSSION
3.1 Our tests show that aromatic hydrocarbons such as benzene, toluene, ethylbenzene and xylenes are found in both the Fuller formulation designated "WC-2291" and "WC-2291-P". Additionally, our test show that 1,1-dichloroethene, a volatile chlorinated hydrocarbon, are present in the reference wax coating materials.

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, and H.B. FULLER AUTOMOTIVE PRODUCTS, INC., jointly and severally,

Defendants.

Civil Action
Case No. 88-CV-73729-DT

Hon. Paul V. Gadola

AFFIDAVIT OF DARRELL W. RIDLING

STATE OF MICHIGAN)
) SS
COUNTY OF OAKLAND)

Darrell W. Ridling, being first duly sworn, deposes and says:

1. I am the Plant Manager of Automotive Finishes, Inc., Dearborn, Michigan, and its subsidiary Brighton Coatings, Inc., Brighton, Michigan.

2. I have been employed in the manufacture of coatings for thirty-six (36) years. My work experience includes twenty-two (22) years at the Inmont (BASF) Milford Avenue Detroit Plant. I left Inmont in 1978.

3. My employment at the Milford Plant included batch making, mill loading and quality control, and various management positions.

4. I am familiar with the Inmont (BASF) S51Z001 wax anti-corrosion coating. This coating was manufactured while I was employed at the Milford Avenue Plant to meet General Motors Material Specification 998-1128.

5. At Inmont, I advanced from Production Worker to the position of Superintendent of the Resin Plant.

6. I am very familiar with the manufacture of coatings, including the preparation and use of production batch sheets and quality control.

7. From 1982 to 1990, I was the Chief Officer and the Majority Stockholder of Brighton Paint Manufacturing Inc.

8. I have reviewed seven 1984 Daubert NOX RUST X-151 production batch sheets, General Motors Material Specification 998-1128, and a Daubert Material Safety Sheet, copies of which are attached. I have also reviewed a letter to General Motors from a Daubert Product Manager, Michael A. Dwyer. Mr. Dwyer's letter indicates that NOX RUST X-151 was manufactured to meet General Motors Material Specification 998-1128.

9. General Motors Material Specification 998-1128 requires the solid content of the coating to be established at the time of approval and set forth in the Material Safety Data Sheet.

10. General Motors suppliers are required to certify that each shipment complies with the requirements of General Motors Material Specification 998-1128.

11. Defects in the attached Daubert batch sheets cause me to believe that the Daubert sheets are false or altered.

12. The defects include (1) missing information, (2) failure to comply with the quality control parameter of percent solids, (3) inconsistent data, (4) excessive batch overages, (5) large variations in viscosity and (5) additions of excessive amounts of naphtha.

Darrell W. Ridling

Subscribed and sworn to before me
this 17-11 day of September, 1992.

Notary Public,
County, Michigan
My Commission Expires: 2-13-95

SUZANNE M. O'SULLIVAN
NOTARY PUBLIC Oakland County, Mich.
My Commission Expires: 02-13-95

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, and H.B. FULLER AUTOMOTIVE, INC., jointly and severally,

Defendants.

Civil Action
Case No. 88-CV-73729-DT

Hon. Paul V. Gadola

AFFIDAVIT OF DAVID W. BYRD

STATE OF MICHIGAN)
)SS
COUNTY OF OAKLAND)

David W. Byrd, being duly sworn, deposes and says:

I am the owner and Laboratory Director of the Absolute Analytical Laboratory, Inc., 1034-D Crooks Road, Clawson, Michigan. I have a B.S. and M.S. Degree in Biological Science. I am presently completing the course requirements for a Masters Degree in Chemical Engineering at Wayne State University. My professional memberships include the American Chemical Society, ANACHEM, and the Chromatography Society. I have over fourteen years of analytical laboratory experience.

I have reviewed U.S. Patent No. 4,356,036, including the claims, H.B. Fuller WC-2291 and WC 2291-P Material Safety Data Sheets, and H.B. Fuller Automotive, Inc. documents relating to the manufacture of Wax Type Anti-Corrosion coating WC-2291 and WC-2291-P.

Claim 1 of U.S. Patent No. 3,959,530 defines a coating composition

consisting essentially of a mixture of wax residue such as paraffin and microcrystalline wax, perchloroethylene, a petroleum distillate having a boiling point ranging between 350° and 380°F., and a nonionic surfactant such as nonylphenoxypoly(ethyeneoxy)ethanol and a small amount of [N,N,N',N'-tetrakis(2-hydroxypropyl)ethylenediamine].

Fuller Material Safety Data Sheet WC-2291 lists the ingredients of a coating as consisting of microcrystalline wax, VM & P Naphtha, aliphatic oil (Hydro-treated), calcium sulfonate, paraffinic wax and an aliphatic resin. Fuller Material Safety Data Sheet WC-2291-P lists the ingredients of a coating which are the same as WC-2291 except for the added ingredient of mineral spirits.

I also conducted an analyses of Fuller coatings WC-2291 and WC-2291-P for chlorinated solvents. The analyses detected the chlorinated solvent 1,1, dichloroethene and the aromatic solvents benzene, toluene, ethylbenzene, xylene in both the WC-2291 and WC-2291-P coatings.

I have also analysed wax coatings taken from the bottoms of the interiors of late model General Motors' doors. Before I removed the samples from their doors, I inspected the interior of the doors and found no evidence that the wax type coating which I analyzed was other than an original factory coating.

The vehicle doors from which I took samples consisted of a 1987 Chevrolet Celebrity VIN 1G1AW51R8H6211705, a 1988 Oldsmobile Delta 88, VIN IG3HN545C7JM316919, and a 1991 Pontiac Grand Prix, VIN 1G2WJ54T6MF263626.

My analyses of the samples of wax coatings taken from the General Motors' doors detected microcrystalline wax in samples from each of the three doors; perchloroethylene in the samples from the 1987 Celebrity and 1988

Oldsmobile doors; methylene chloride in the sample from the 1991 Pontiac door; and zinc and surfactants in the sample from the 1991 Pontiac Grand Prix Door.

I also forwarded a sample from the 1991 Pontiac door to the Charles Evans and Associates Laboratory in Redwood City, California for an ESCA analysis (Electron Spectroscopy for Chemical Analyses). The ESCA detected evidence of organochlorine compounds, sulfur in oxidized form, and ligand functionalities (chelating functionalities).

I have compared the ingredients of claim 1 of U.S. Patent No. 3,959,530 with the ingredients listed in H.B. Fuller Batch Sheet for WC-2291-P Batch No. A010991 and my analyses of the WC-2291-P coating.

U.S. Patent No. 3,959,530	WC-2291-P
Mixture of a Wax Residue	Multi Wax ML 445
Perchloroethylene	1,1 dichlorethene
Petroleum Distillate B.P. = 350° and 380°F	Mineral Spirits
Nonionic Surfactant	Lockhart Neutral Barium Sulfonate 3605
[N,N,N',N'-tetrakis (2-hydroxypropyl) ethylenediamine] (chelating agent)	Lubrizol 2087 (a dispersion of a Metallo-Complex

The comparison shows that the H.B. Fuller wax type anti-corrosion coating has the ingredients or their equivalents of claim 1 of U.S. Patent No. 3,959,530.

Further deponent sayeth not.

David W. Byrd

Subscribed and sworn to before me
this 19th day of October, 1992

CAROLINA MOLANE
Notary Public, Oakland County, MI
My Commission Expires 17 Yrs

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

NICOLAS KALIARDOS,

Plaintiff,

vs.

GENERAL MOTORS CORPORATION, BASF CORPORATION, DAUBERT INDUSTRIES, INC., H.B. FULLER COMPANY, and H.B. FULLER AUTOMOTIVE INDUSTRIES, INC., jointly and severally,

Defendants.
_____/

Civil Action
Case No. 88-CV-73729-DT

Hon. Paul V. Gadola

AFFIDAVIT OF DR. PETER O. WARNER

STATE OF MICHIGAN)
)
COUNTY OF WAYNE)

Dr. Peter O. Warner, being duly sworn, deposes and says:

I am the Director of Technical Services, Wayne County Air Pollution Control Laboratory, Detroit, Michigan and a member of the adjunct faculty of Wayne State University, Department of Occupational and Environmental Health. I was President of the Association of Analytical Chemists in 1976. In 1979 I received the Anachem Fellow Award. I am presently Chairman of Air and Waste Management Association, Technical Committee EE-6. In 1990 I was Chairman of the AWMA Specialty Conference, Detroit, Michigan.

I have a Ph.D. Degree in Analytical Chemistry. This degree was awarded to me by Wayne State University in 1964. Additional professional experience, awards, and offices in professional societies, together with technical articles I have authored are summarized in the attached resume.

I am intimately familiar with perchloroethylene, air pollutants and air sampling and am the author of the textbook Analysis of Air Pollutants, New York, John Wiley, Inc., 1976. I have worked with perchloroethylene in preparing formulations for industrial use.

I have reviewed Shrader Laboratories, Inc. Report No. A61501 and A61502 and Clayton Environmental Consultants, Inc. Report of Project No. 62922-17 for the purpose of providing an opinion of whether the perchloroethylene detected in samples are contaminants caused by urban atmospheric pollution.

In my opinion, neither the 24.8 ppb perchloroethylene which Shraeder Laboratories, Inc. detected in sample A61502 or the 91 ppm perchloroethylene which Clayton Environmental Consultants, Inc. detected in sample 998-1128 are contaminants caused by atmospheric pollution.

Air sampling data indicates that perchloroethylene in an urban atmosphere is within a range of .07 to .30 ppb. This is substantially below the 24.8 ppb and 91 ppm levels of perchloroethylene which the laboratories detected in the samples.

I am not aware of any wax materials having an affinity to absorb chlorinated solvents from the atmosphere and concentrate the chlorinated solvents to produce levels higher than the levels absorbed from the atmosphere.

I know of no mechanism by which this absorption/concentration could take place.

Dr. Peter O. Warner

Subscribed and sworn to before me
this 16th day of October, 1992

ABSOLUTE ANALYTICAL LABORATORY
1030-D North Crooks Road
Clawson, Michigan 48017
313-435-5100

ALEX RHODES,P.C.
30100 TELEGRAPH ROAD;SUITE 460
BINGHAM FARMS,MI 49025
ATTN:ALEX RHODES

RE:

PROJECT	:EQUIVALENCE TESTING
SAMPLE DESCRIPTION	:ANTI-RUST COATING
TEST OBJECTIVE	:SURFACE TENSION AND ADHESION TESTING
ABSOLUTE LAB I.D.#	:93.01023.1762
DATE REPORTED	:12/30/93

At your request Absolute Analytical Inc. has performed laboratory testing to demonstrate equivalence of chemical substitutes present in General Motors 998-1128/998-2150 wax type anti-corrosion coating, manufactured by BASF Corporation, Daubert Industries, Inc. and H. B. Fuller Automotive Products,Inc.; and the ingredients in the claims of U.S. Patents Nos. 3,959,530 and 4,356,036. Specifically we have performed testing with respect to surface active properties, chelation, and surface degreasing properties. The tests which we have performed to evaluate equivalency include measures of surface tension and adhesion. The criteria used to ascribe equivalence is determined by the definition of any two substances which perform substantially the same overall function, in substantially the same way, to obtain substantially the same overall result.

It should be noted that the chemical substances which were tested are well known and that the equivalence of these substances in the subject coatings were previously developed in Affidavits and depositions of David W. Byrd.

SUMMARY

Our testing for equivalence with respect to surfactants properties, chelation, and chlorinated solvent surface degreasing properties demonstrate equivalency to those chemical agents specified in the claims of U.S. Patent Nos 3,959,530 and 4,356,036. From our test survey we can say that:

1. the following agents are equivalent to the Igepal in surface active properties when mixed with the synthetic mixture of Anti-Rust Compound 998-1128 formula number S51Z001 (formula date 10-23-74):

   stearic acid
   barium sulfonate
   calcium sulfonate
   lead sulfonate

Absolute Analytical Laboratory
Clawson, Michigan
313.435.5100

CLIENT	:ALEX RHODES, P.C.
PROJECT	:EQUIVALENCE TESTING
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ABSOLUTE LAB I.D.#	:93.01023.1762

SUMMARY (continued)

2. the following agents are equivalent to the Quadrol in surface chelating properties when mixed with the synthetic mixture of Anti-Rust Compound 998-1128 formula number S51Z001 (formula date 10-23-74):

   methylenedianiline
   barium sulfonate
   calcium sulfonate
   lead sulfonate

3. the following agents are equivalent to the perchloroethene in surface degreasing properties when mixed with the synthetic mixture of Anti-Rust Compound 998-1128 formula number S51Z001 (formula date 10-23-74) which was modified to include 1 % Igepal and 0.5 % Quadrol.

   methylene chloride
   trichloroethylene
   1,1 dichloroethene

TEST OUTLINE

The materials were divided into three groups based upon their functions in the wax type anti-corrosion coating under investigation. These groups consisted of surfactants (surface active agents), chelating agents, and chlorinated solvents. In cases were dual functions were ascribed to a chemical substance it was included in both test series.

The ingredient and its functional equivalent were evaluated by testing in a wax type anti-corrosion coating. The wax-type coating used for the test series was supplied by Nicolas Kaliardos together with a BASF S51Z001 (GM998-1128) Master Formula Sheet which Mr. Kaliardos stated was used for preparing the coating (see attached copy).

Absolute Analytical Laboratory
Clawson, Michigan
313.435.5100

CLIENT :ALEX RHODES, P.C.
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ABSOLUTE LAB I.D.# :93.01023.1762

1.0 SURFACTANTS

1.1 Surfactants are surface active agents which reduce the surface tension of liquids. The reduction of the surface tension of a liquid will allow for the greater dispersal of the liquid. With respect to the wax coatings the function of the surfactant is to improve the ability the coating to spread over the surface of the metal. The measurement of surface tension is a widely practiced method for the assessment of surface active agents. Specifically, we have performed surface tension measurements of a synthetic mixture of Anti-Rust Compound 998-1128 formula number S51Z001 (formula date 10-23-74) which was diluted with xylene in order to effect surface measurement. Surface tension measurements of the Anti-Rust coating mixed with Igepal were compared to surface tension measurements of the same Anti-Rust coating 998-1128 in combination with the following compounds:

stearic acid
barium sulfonate
calcium sulfonate
lead sulfonate

1.2 The mixtures were evaluated for surface tension reduction using the capillary tube method as outlined in Findlay's Practical Physical Chemistry, 8th edition, pages 94-97. Our results are tabulated on the attached data sheets (see table I).

2.0 ADHESION EVALUATION OF CHELATING MIXTURES

2.1 The chelating agents bind to metals and allow for the greater solution of metals. The inclusion of the chelating agent Quadrol resulted in better binding to the metal substrates. In order to evaluate equivalence of Quadrol we have performed adhesion measurements of a synthetic mixture of Anti-Rust Compound 998-1128 formula number S51Z001 (formula date 10-23-74) and Quadrol to determine if surface activity equivalence exists between the Anti-Rust Compound 998-1128 when combined with the following compounds:

methylenedianiline
barium sulfonate
calcium sulfonate
lead sulfonate

Absolute Analytical Laboratory
Clawson, Michigan
313.435.5100

CLIENT :ALEX RHODES, P.C.
PROJECT :EQUIVALENCE TESTING
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ABSOLUTE LAB I.D.# :93.01023.1762

2.2 The assessment of the chelating agent upon the various test mixtures was evaluated by applying the test mixture to a metal substrate as a film. The dried film was then evaluated for adhesion using the American Society for Testing Materials test method D 3359-90 "Standard Test Methods for Measuring Adhesion by Tape Test". Our test results are tabulated in table II (see attachment).

3.0 ADHESION EVALUATION OF CHLORINATED ANTI-RUST MIXTURES

3.1 The chlorinated solvents in Anti-Rust formulations act as degreasing agents which improve adhesion to the metal substrate which may be covered with a mill oil or similar protective oil. In order to evaluate equivalence of perchloroethene in Anti-Rust formulations we have performed adhesion measurements of a synthetic mixture of Anti-Rust Compound 998-1128 formula number S51Z001 (formula date 10-23-74) which was modified to include 1 % Igepal and 0.5 % Quadrol. We refer to this mixture as "B". To "B" we have added the following chlorinated solvents:

methylene chloride
trichloroethylene
1,1 dichloroethene

3.2 The assessment of the chlorinated solvents upon the various test mixtures was evaluated by applying the test mixture to a metal substrate which been treated with a film of mill oil. The dried film was then evaluated for adhesion using the American Society for Testing Materials test method D 3359-90 "Standard Test Methods for Measuring Adhesion by Tape Test". Our test results are tabulated in table III (see attachment).

If you have questions or are in need of additional service please feel free to contact us at your earliest convenience.

Absolute Analytical Laboratory,

David W. Byrd, M.S.
Laboratory Director

enclosures (4)

TABULAR SURMMARY OF TEST DATA; REPORT 93.01023.1762

I. SURFACTANTS

TREATMENT	TEST 1	TEST 2	TEST3	AVE
20ml A+0.2 g IGEPAL	16.0	16.0	16.0	16.0
20ml A+0.2 g STEARIC ACID	15.5	15.5	15.5	15.5
20ml A+0.2 g BARIUM SULFONATE	16.0	16.0	16.2	16.07
20ml A+0.2 g LEAD SULFONATE	16.2	16.2	16.0	16.13
20ml A+1.0 g CALCIUM SULFONATE	16.2	16.1	16.2	16.17

II. ADHESION EVALUATION OF CHELATING MIXTURES

The tables IIA., IIB., AND III. refer to the Standard Test Methods for Measuring Adhesion by Tape Test (ASTM D 3359-90). Tables IIA. and III. involve Test Method A: X-Cut Tape Test. Table IIB. involves Test Method B: Cross-Cut Tape Test.

TABLE IIA.

TREATMENT	TEST 1A	TEST 2A
A + .5% QUADROL	1	1
A + .5% MDA	1	1
A + .5% BARIUM SULFONATE	1	1
A + .5% CALCIUM SULFONATE	1	1
A + .5% LEAD SULFONATE	1	1

TABLE IIB.

TREATMENT	TEST 1B	TEST 2B	TEST 3B
A + .5% QUADROL	1	1	2
A + .5% MDA	1	1	2
A + .1% BARIUM SULFONATE	2	2	N.T.
A + .5% CALCIUM SULFONATE	2	3	2
A + .5% LEAD SULFONATE	3	3	3

III. ADHESION EVALUATION OF CHLORINATED ANTI-RUST MIXTURES

In all treatments we have used the submitted synthetic mixture of Anti-Rust Compound 9981128 (formula S51Z001 10/23/74) plus 1 % Igepal and 0.5% Quadrol. We refer to this mixture as "B". These formulations were tested on a metal substrate which had be covered with a thin film of mill oil.

TABLE III.

TREATMENT	TEST 1A	TEST 2A
B + PERCHLOROETHENE	2	2
B + METHYLENE CHLORIDE	2	2
B + TRICHLORETHYLENE	2	2
B + 1,1 DICHLORETHENE	2	2

TABLE OF TEST MATERIALS

COMMON NAME	ACTIVE INGRIEDIENT	SUPPLIER
MDA-(13,245-4)	4,4-METHYLENEDIANILINE	ALDRICH
BARIUM SULFONATE	BARIUM PETRONATE	WITCO (36504)
CALCIUM SULFONATE	CALCIUM ALKYLARYL-SULFONATE (VANCORR 073)	R.T. VANDERBILT (48451)
NA-SUL-LS (3839)	LEAD SULFONATE	KING INDUSTRIES
QUADROL	N,N,N',N'-TETRAKIS(2-HY DROXYPROPYL)ETHYLEDIAMINE	BASF (588540)
STEARIC ACID	INDUSTRENE 7018	WITCO (93271011)
PERCHLOROETHENE	PERCHLOROETHENE	DOW CHEMICAL
DICHLOROETHENE	1,1-DICHLOROETHENE 99%	CHEM SERVICE (119-32B)
IGEPAL	IGEPAL CO-530	RHONE-POULENC
TRICHLOROETHENE	TECH GRADE	TROY SCIENTIFIC

13650 E. TEN MILE RD., P.O. BOX 306
WARREN, MICH. 48090

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER (as it appears on label) WC-2291	
MANUFACTURER'S NAME H.B. FULLER AUTOMOTIVE PRODUCTS, INC.	EMERGENCY TELEPHONE NO. (313) 776-5000
ADDRESS (Number, Street, City, State and Zip Code) 13650 EAST TEN MILE ROAD, WARREN, MI 48089	MANUFACTURER'S D-U-N-S NO. 18-966-3206
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) COMPOUND VEHICLE SEALER - FLAMMABLE LIQUID N.O.S. UN 1993	
ADDITIONAL HAZARD CLASSES (as appropriate) NONE	
CHEMICAL FAMILY HYDROCARBON	FORMULA MIXTURE

**ALL INGREDIENTS LISTED ON TSCA INVENTORY.

SECTION II — INGREDIENTS (list all ingredients)

CAS REGISTRY NO.	%W (circled)	%V	CHEMICAL NAME(S)	Listed as a Carcinogen in NTP, IARC or OSHA 1910(z) (specify)
63231-60-7	15-30		MICROCRYSTALLINE WAX	NONE
8032-32-4	20-40		VM & P NAPHTHA	NONE
64741-89-5 64742-52-5	0-5		ALIPHATIC OIL (HYDRO-TREATED)	NONE
61789-86-4	5-10		CALCIUM SULFONATE	NONE
8002-74-2	5-10		PARAFINIC WAX	NONE
64742-16-1	15-30		ALIPHATIC HYDROCARBON RESIN	NONE

SECTION III — PHYSICAL DATA

BOILING POINT 244 °F ___ °C		SPECIFIC GRAVITY (H,O = 1)	0.91		
VAPOR PRESSURE ___ °F ___ °C [X] 2 mm Hg [ ] ots		PERCENT VOLATILE BY VOLUME (%)	41.5	PERCENT SOLID BY WEIGHT (%)	62
VAPOR DENSITY (AIR = 1)	4.4	EVAPORATION RATE (TOLUENE = 1)	0.45		
SOLUBILITY IN WATER	NIL	pH =	N/A		
APPEARANCE AND ODOR CARMEL COLORED LIQUID - MILD ODOR				IS MATERIAL: (LIQUID) SOLID GAS PASTE POWDER	

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 50 °F ___ °C method used T.C.C.	FLAMMABLE LIMITS: LEL 1.1 UEL 5.0
EXTINGUISHING MEDIA CO2, DRY CHEMICAL, FOAM	
SPECIAL FIRE FIGHTING PROCEDURES WATER MAY BE INEFFECTIVE DUE TO FROTHING.	
UNUSUAL FIRE AND EXPLOSION HAZARDS MAY GIVE OFF CO ON COMBUSTION. FLAMMABLE SOLVENTS HEAVIER THAN AIR.	

SECTION V-HEALTH ...ZARD DATA

EFFECTS OF OVEREXPOSURE — Conditions to Avoid	THRESHOLD LIMIT VALUE PERMISSIBLE EXPOSURE LIMIT — TWA 350 MG/M3
HEADACHES OR DIZZINESS	OTHER LIMIT (XX) MAC 500 PPM

PRIMARY ROUTES OF ENTRY Inhalation (X) Skin Contact ( ) Other (specify)

EMERGENCY AND FIRST AID PROCEDURES REMOVE TO FRESH AIR.

SECTION VI-REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	XX	SPARKS OR OPEN FLAMES

INCOMPATIBILITY (materials to avoid) STRONG OXIDIZERS

HAZARDOUS DECOMPOSITION PRODUCTS: MAY GIVE OFF CO ON COMBUSTION.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	XX	N/A

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED DIKE LARGE SPILLS. USE ABSORBANT ON SMALL SPILLS; AVOID SPARKS OR FLAMES.

WASTE DISPOSAL METHOD DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULAT

CERCLA (Superfund) REPORTABLE QUANTITY (in lbs) ONE POUND - (CERCLA STATUTORY RQ)

RCRA HAZARDOUS WASTE NO. (40 CFR 261.33) D001

VOLATILE ORGANIC COMPOUND (VOC) (as packaged, minus water) 2.6 LBS.

(X) Theoretical 2.6 lb/gal ( ) Analytical ____ lb/gal

SECTION VIII-SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) YES; IF MAC OF 500 PPM IS EXCEEDED (CHARCOAL).

VENTILATION	LOCAL EXHAUST (Specify Rate) PER PLANT REQUIREMENT	SPECIAL	NONE
	MECHANICAL (General) (Specify Rate) 60 FEET PER MINUTE	OTHER	NONE

PROTECTIVE GLOVES (specify type)	(NEOPRENE TYPE) FOR CLEANLINESS	EYE PROTECTION (specify type)	SAFETY GLASSES OR EYE SHIELD PER PLANT RE-
OTHER PROTECTIVE EQUIPMENT	NONE		QUIREMENTS.

SECTION IX-SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING STORE AWAY FROM OPEN FLAME, STORE INSIDE BELOW 95°F.

OTHER PRECAUTIONS NONE

REV 5/8/90

DATE PREPARED: MAY 15, 1989

NAME: MIKE PELLNY

TITLE: R&D TECHNICAL DIRECTOR

SIGNATURE: Mike Pellny

H.B. FULLER AUTOMOTIVE PRODUCTS, INC.
13650 E. TEN MILE RD., P.O. BOX 306
WARREN, MICH. 48090

MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER (as it appears on label) WC-2291-P	
MANUFACTURER'S NAME H.B. FULLER AUTOMOTIVE PRODUCTS, INC.	EMERGENCY TELEPHONE NO. (313) 776-5000
ADDRESS (Number, Street, City, State and Zip Code) 13650 EAST TEN MILE ROAD, WARREN, MI 48089	MANUFACTURER'S D-U-N-S NO. 18-966-3206
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) COMPOUND BODY SEALER - FLAMMABLE LIQUID/FLAMMABLE LIQUID NOS LIQUID	
ADDITIONAL HAZARD CLASSES (as appropriate) NONE	
CHEMICAL FAMILY PETROLEUM DISTILLATES	FORMULA MIXTURE

*ALL INGREDIENTS LISTED ON TSCA INVENTORY.

SECTION II — INGREDIENTS (list all ingredients)

CAS REGISTRY NO.	%W	%V	CHEMICAL NAME(S)	Listed as a Carcinogen in NTP, IARC or OSHA 1910(z) (specify)
63231-60-7	20	-30	MICROCRYSTALLINE WAX	NONE
8032-32-4	30	-40	VM & P NAPHTHA	NONE
64741-88-4	1-5		ALIPHATIC OIL - SEVERELY HYDROGENATED	NONE
61789-86-4	5	-10	CALCIUM SULFONATE	NONE
8002-74-2	5	-10	PARAFINIC WAX	NONE
68131-47-5	10	-20	ALIPHATIC RESIN	NONE
8032-32-4	1	-5	MINERAL SPIRITS	NONE

SECTION III — PHYSICAL DATA

BOILING POINT 244 °F ___ °C		SPECIFIC GRAVITY (H_2O = 1)	0.839	V.O.C.	2.8
VAPOR PRESSURE ___ °F ___ °C MAX 2.0 ☐ mm Hg ☐ psi		PERCENT VOLATILE BY VOLUME (%)	60	PERCENT SOLID BY WEIGHT (%)	60%
VAPOR DENSITY (AIR = 1)	4.4	EVAPORATION RATE (= 1)	0.45		
SOLUBILITY IN WATER	NIL	pH =	N/A		
APPEARANCE AND ODOR CARMEL COLORED LIQUID - MILD ODOR				IS MATERIAL: GAS PASTE (LIQUID) SOLID POWDER	

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT 50 °F ___ °C method used T.C.C.	FLAMMABLE LIMITS LEL 1.1 UEL 5.0
EXTINGUISHING MEDIA	CO_2, DRY CHEMICAL, FOAM
SPECIAL FIRE FIGHTING PROCEDURES	WATER MAY BE INEFFECTIVE DUE TO FROTHING.
UNUSUAL FIRE AND EXPLOSION HAZARDS	FLAMMABLE SOLVENTS, HEAVIER THAN AIR.

SECTION V-HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE — Conditions to Avoid	THRESHOLD LIMIT VALUE / PERMISSIBLE EXPOSURE LIMIT / OTHER LIMIT
HEADACHE OR DIZZINESS; MAY REMOVE OIL FROM SKIN.	MAC 500 PP

PRIMARY ROUTES OF ENTRY Inhalation [X] Skin Contact [X] Other (specify)

EMERGENCY AND FIRST AID PROCEDURES REMOVE TO FRESH AIR.

SECTION VI-REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID SPARKS OR OPEN FLAMES.
	STABLE	XX	

INCOMPATIBILITY (materials to avoid) STRONG OXIDIZERS.

HAZARDOUS DECOMPOSITION PRODUCTS: MAY FORM CO_2 - CO ON COMBUSTION.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID STRONG OXIDIZERS
	WILL NOT OCCUR	XX	OPEN FLAMES

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

AVOID SPARKS OR OPEN FLAMES.

WASTE DISPOSAL METHOD DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATI

CERCLA (Superfund) REPORTABLE QUANTITY (in lbs) ONE POUND - (CERCLA STATUTORY RQ) ...

RCRA HAZARDOUS WASTE NO. (40 CFR 261.33) D001

VOLATILE ORGANIC COMPOUND (VOC) (as packaged, minus water) 2.8

[X] Theoretical 2.8 lb/gal [ ] Analytical _____ lb/gal

SECTION VIII-SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type) YES, IF MAC OF 500 PPM IS EXCEEDED (CHARCCAL).

VENTILATION	LOCAL EXHAUST (Specify Rate)		SPECIAL
	MECHANICAL (General) (Specify Rate)	60 FEET PER MINUTE	OTHER

PROTECTIVE GLOVES (specify type)	NEOPRENE TYPE (FOR CLEANLINESS)	EYE PROTECTION (specify type)	SAFETY GLASSES / EYE SHIELD PER
OTHER PROTECTIVE EQUIPMENT	NONE		PLANT REQUIREMEN

SECTION IX-SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING STORE AWAY FROM OPEN FLAMES AND SPARKS

OTHER PRECAUTIONS VAPORS HEAVIER THAN AIR.

REV 9/13/89
REV 4/4/90

DATE PREPARED: MAY 15, 1989

NAME: MIKE PELLNY

TITLE: R&D TECHNICAL DIRECTOR

SIGNATURE: Mike Pellny

BEST AVAILABLE COPY

/LS

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GENERAL MOTORS CORPORATION
MATERIAL SAFETY DATA SHEET

SECTION I

PRODUCT NAME OR NUMBER (as it appears on label) Nox Rust X-170	GM COMMON CODE 498-2150
MANUFACTURER'S NAME Daubert Chemical Company	EMERGENCY TELEPHONE NO. 312-496-7350
ADDRESS (Number, Street, City, State and Zip Code) 4700 S. Central Ave., Chicago, IL 60638	MANUFACTURER'S D-U-N-S NO.
HAZARDOUS MATERIAL DESCRIPTION, PROPER SHIPPING NAME, HAZARD CLASS, HAZARD ID NO. (49 CFR 172.101) Flammable Liquid	
ADDITIONAL HAZARD CLASSES (as applicable)	
CHEMICAL FAMILY Wax/Resin Dispersion	FORMULA

SECTION II — INGREDIENTS
(list all ingredients)

CAS REGISTRY NO.	%W	%V	CHEMICAL NAME(S)	Listed as a Carcinogen in NTP, IARC or OSHA 1910(z) (specify)
8032-32-4	42		VM&P Naptha	NO
64742-61-6	<20		Petroleum Wax	NO
94742-16-1	<40		Hydrocarbon Resin	NO
25619-56-1	< 3		Barium Sulfonates	NO
7631-86-9	T		Silica	NO
64741-97-5 and/or 64742-53-6	<10		Petroleum Oil (Severely solvent refined and/or severely hydro treated)	NO

SECTION III — PHYSICAL DATA

BOILING POINT 230 °F ___ °C		SPECIFIC GRAVITY (H_2O = 1)	0.868		
VAPOR PRESSURE @ 77 °F ___ °C ☒ mm Hg ☐ psi	2.0	PERCENT VOLATILE BY VOLUME (%)	46	PERCENT SOLID BY WEIGHT (%)	60
VAPOR DENSITY (AIR = 1)	> 1	EVAPORATION RATE (Butyl Acetate = 1)	0.45		
SOLUBILITY IN WATER	NIL	pH =	NA		
APPEARANCE AND ODOR Tan colored viscous liquid/solvent odor		IS MATERIAL: GAS PASTE (LIQUID) SOLID POWDER			

SECTION IV — FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Min.) 50 °F ___ °C method used TCC	FLAMMABLE LIMITS	LEL 0.6	UEL 6.0
EXTINGUISHING MEDIA CO_2, Dry Chemical, Foam			
SPECIAL FIRE FIGHTING PROCEDURES Treat as petroleum solvent fire.			
UNUSUAL FIRE AND EXPLOSION HAZARDS None			

SECTION V-HEALTH HAZARD DATA

EFFECTS OF OVEREXPOSURE — Conditions to Avoid: Loss of coordination	THRESHOLD LIMIT VALUE ☒ 200 / PERMISSIBLE EXPOSURE LIMIT ☐
Drowsiness	OTHER LIMIT ☐

PRIMARY ROUTES OF ENTRY Inhalation ☒ Skin Contact ☐ Other (specify)

EMERGENCY AND FIRST AID PROCEDURES: Remove to fresh air. Seek medical attention.

SECTION VI-REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID
	STABLE	X	

INCOMPATIBILITY (materials to avoid): Oxidizing agents

HAZARDOUS DECOMPOSITION PRODUCTS: Products of combustion, CO_2, CO

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

SECTION VII-SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Eliminate all source of ignition. Absorb into inert media and remove.

WASTE DISPOSAL METHOD: Treat as petroleum solvent/wax blend.

CERCLA (Superfund) REPORTABLE QUANTITY (in lbs)

RCRA HAZARDOUS WASTE NO. (40 CFR 261.33): D001

VOLATILE ORGANIC COMPOUND (VOC) (as packaged, minus water)

☒ Theoretical 2.89 lb/gal ☐ Analytical _____ lb/gal

SECTION VIII-SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type): NIOSH /MESA approved TC-23C-50

VENTILATION	LOCAL EXHAUST (Specify Rate) Sufficient if not confined to small area.	SPECIAL
	MECHANICAL (General) (Specify Rate)	OTHER

PROTECTIVE GLOVES (specify type)	EYE PROTECTION (specify type) Goggles

OTHER PROTECTIVE EQUIPMENT: Rubber shoes and apron if excessive splashing is expected.

SECTION IX-SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Store away from high heat and open flames.

OTHER PRECAUTIONS

Seller agrees not to assert any claim (other than a claim for a patent infringement) against General Motors Corporation for any use or disclosure of any technical data or information disclosed in connection with this questionnaire.

PLEASE COMPLETE QUESTIONNAIRE AND RETURN TO:	Name (print)
	Signature
	Title Chief Chemist
	Date